CERTAIN CHARACTERISTICS OF THE BIOGRAPHEES LISTED IN AMERICAN MEN OF SCIENCE - THE SOCIAL AND BEHAVIORAL SCIENCES, VOLUME III

A THESIS

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MASTER OF ARTS

BY

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DEDICATED

TO

MY PARENTS

MR. & MRS. EDDIE HUMPHREY, SR.

FOR THEIR MULTI-FACETED ENCOURAGEMENT

G.L.H.

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CHAPTER I

INTRODUCTION

Rationale.--Never in the history of this country has there been a greater need for scholars in the social and behavioral sciences than in the latter half of the twentieth century. The developing culture and expanding economy of the United States, the complex social structure which characterizes its life, the demands of national defense, and the increased birth rate all combine to make the need for more highly trained intelligence a necessity. A wide diversity of knowledge and skills is needed by our dynamic economy. The need for men and women trained in the various specialized fields of science - the social, physical, biological or behavioral sciences, and at the same time equipped with broad human understanding is certain to make a tremendous demand upon our societies reservoir of talents.

However, if present trends in college and graduate school registration continue the United States can double the number of students receiving doctoral degrees in science and engineering, and the number of professional scientists and engineers in its labor force by 1970. In a report entitled "Investing in Scientific Progress" issued by the National Science Foundation it was noted that during the past thirty years the number of professional scientists in the labor force had grown an average of 6 per cent a year. This increase refers not only to the physical scientists but to the social scientists as well. From 1956-1958 the scientific personnel in the social sciences in the federal government had increased from 5,852 to 9,335. These scientists were

employed in the following: economics, history, geography, social science, psychology, and certain anthropological sciences.[1] If this rate continues the total of 1,400,000 in 1960 will rise to 2,500,000 in 1970.[2] It is, therefore, feasible to assume that each decade in the future will increasingly demand a great proportion of highly trained individuals.

Our problem then is: Where are we to find the resources to meet these additional demands? How effectively are we discovering and utilizing our intellectual potential?

America has so notably improved its rank among the nations in scientific scholars that it is reasonable to inquire why. Before 1900 it had contributed less to total scientific advancement than had a number of countries. By 1960 it had risen so notably that it led in most sciences and was surpassed in total recent scientific contributions and contributors by perhaps no other country.

The spectacular rise was due, of course, to the combined effects of numerous influences. Some of the most potent of these were: rapid increase in population, and the notable rise in average educational attainment. Presumably much more significant than the first two influences in causing the increase in scientific scholars was the establishment of John Hopkins University, the first real graduate school. With a faculty of many exceptionally able men enthusiastic in the advancement of science, it attracted and greatly stimulated numerous able students, many of whom later became renown

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[1] Scientists and Engineers in the Federal Government, October, 1958 (Washington: U. S. Government Printing Office, 1958), p. 3.

[2] "The Cost of Science Education," Scientific American, CCV (September, 1961), p. 84.

for their work. The Carnegie Institution of Washington which affords opportunities for much research, the Rockefeller Foundations which finance highly significant post doctoral fellowships, and the Guggenheim Foundation fellowships have greatly contributed to increasing the output and excellency of American Scientists. J. M. McKeen Cattell (1860-1944) made contributions through the publication of Scientific journals, Science, The Scientific Monthly, The American Naturalist, and School and Society. These four journals were highly significant media of publications in rather broad fields, and as sources of news for scientist. Perhaps the most significant contribution Cattell made was in editing American Men of Science which has been successful in making men of science cognizant of each other. Cattell chose to indicate by asterisks in each edition to recognize leaders in each field. He chose anatomy, anthropology, astronomy, botany, chemistry, geology, mathematics, pathology, physics, psychology, and zoology as the fields of work in which eminent workers would be recognized. Visher has this to say about the use of starring.

> The star is a recognition which not only gives the recipient satisfaction, but also increases his opportunities. It is a challenge to the recipient to continue his good work and to others who aspire to win this recognition. Vast amounts of work have been completed as a result of this rivalry. Many scientists who are not starred feel confident that they are "as good a man as ..." and consequently set out to prove it.[1]

But despite the contributions that have been made there is still a need for concentration and knowledge about the backgrounds, characteristics and circumstances of individuals in the sciences, in order to guide the selection and promote the recruitment of young persons into scientific work.

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[1] Stephen S. Visher, "J. McKeen Cattell and American Science," School and Society, LXVI (December, 1947), 451.

A good education in the physical and natural scientists for our specialists is not enough. If America is to continue to move forward in scientific circles and to compete successfully with the Soviet Union we will need a broader understanding in the field of the social and behavioral sciences - anthropology, sociology, economics, political science, history, and psychology. By producing scholars in these fields we will not only be able to explore the exosphere but also to understand the theory and practice of communism.

To this end the writer feels that we should provide for the fullest possible development of students interested in the social and behavioral sciences, increase recognition of those who have achieved in this area, and that a study of the origins of some of these scholars should be made. Today there is no room for deviation in the development of scholars and it would almost appear that a candidate must be prepared from birth. If asked where these scholars in the social and behavioral sciences come from and what they are like, the average person would probably say that they flow mainly from the major centers of intellectual activity and are prepared predominately in our great schools and universities.

Therefore, it seems feasible to the writer, it is not adequate or accurate, to study some of the characteristics of these individuals with the hope of finding answers to the purposes below.

Evolution of the Problem.--The writer's interest in this project was an outgrowth of a lecture given by Dr. Paul I. Clifford on "Identifying The Gifted" during the second semester of the 1961-62 school year to the enrollees of the N. D. E. A. Counseling and Guidance Institute at Atlanta University, Atlanta, Georgia. In this lecture the point was made that today there is

much effort being devoted to the selection and training of able and gifted youngsters, with increased emphasis on guiding them into scientific and technical careers. Therefore it seemed beneficial to the writer to study some of the characteristics of men who have already become scientists and scholars with the hopes that a look at some of their attributes would serve as indices in guiding the future of those who follow after them.

A long period of time was necessary to effectively conduct a voluminous study of this type. For this reason, the study was carried on by three other individuals, who each studied a sample of the 25,000 individuals listed in the ninth edition of American Men of Science, Volume III.

Contributions to Educational Knowledge.--The writer hopes that the analysis and interpretation of the data in this research will indicate the following contributions to educational knowledge and research.

1. That it may reveal the kinds of information which may be valuable in producing, selecting, and educating young men in the social and behavioral sciences.
2. That it may provide information for administrators which may be used in staffing colleges and universities.
3. That it will shed some light on the problems of higher education and advanced training.
4. That it will provide supplementary recognition of the contributions of these individuals and that it will aid in increasing their achievement in research.
5. That it will stimulate other researchers to conduct similar studies in subsequent editions of American Men of Science.

Statement of the Problem.--The problem involved in this research was to study certain characteristics revealed by the biographical sketches of the first 3,900 individuals in the social and behavioral sciences listed in the ninth edition of American Men of Science edited by Jaques Cattell.

Purpose of the Study.--The general purpose of this study was to analyze the biographical data of 3,900 individuals in the social and behavioral sciences listed in the ninth edition of American Men of Science.

More specifically the objectives of this research were:

1. To determine the geographical distribution of birthplaces of individuals in the social and behavioral sciences listed in American Men of Science.
2. To determine the geographical distribution of residences of individuals in the social and behavioral sciences listed in American Men of Science.
3. To determine the 1962 mean age of individuals in the social and behavioral sciences listed in American Men of Science.
4. To determine the current marital status of individuals in the social and behavioral sciences listed in American Men of Science.
5. To determine the mean age at marriage by individuals in the social and behavioral sciences listed in American Men of Science.
6. To determine the current mean size of families of individuals in the social and behavioral sciences listed in American Men of Science.
7. To determine five characteristics, relative to educational

training of individuals in the social and behavioral sciences as listed in American Men of Science.

(a) To determine the identity and the geographical distribution of their baccalaureate origins.

(b) To determine the identity and the geographical distribution of colleges attended for graduate study to obtain Master's degrees.

(c) To determine the time lapse between the baccalaureate and the Master's degrees.

(e) To determine the time lapse between the Master's and the doctoral degrees.

8. To determine the fields of specialization of individuals in the social and behavioral sciences listed in American Men of Science.

9. To determine the mean age at which individuals in the social and behavioral sciences listed in American Men of Science earned each degree.

10. To determine the kinds of professional positions individuals in the social and behavioral sciences listed in American Men of Science presently hold and have held in the past.

11. To determine the identity and the number of professional, scientific and learned organizations and societies in which individuals in the social and behavioral sciences of American Men of Science hold membership.

12. To formulate whatever implications for educational theory and practice which may be indicated by the data.

Limitations of the Study.--The significant limitations of this study

were as follows:

1. The source of data upon which the entire study depended were the entries in American Men of Science, Volume III. This writer was concerned with the first 3,900 individuals listed and not with those whose names appeared under cross reference and whose sketches appeared in another volume of American Men of Science.
2. This was the first edition of American Men of Science which dealt solely with the social and behavioral sciences and did not have completeness. It was the first time that most of the subjects had been included in any edition and many names were misclassified and incorrectly dropped. The editor anticipates that the next edition will be complete as the importance of this biographical work is brought to the attention of those in the Social Science fields.
3. This study did not attempt to measure intelligence, personality, or adjustment. It was tangentially concerned with determining certain factors which must be associated with the success of the individuals studied.

Definition of Terms.--For the purpose of this study the terms social science, behavioral science and subjects were defined as follows:

1. "Social Science" refers to any science concerned with men living in relation to other men in a social environment and with social organization. The recognized social sciences in this study are economics, philosophy, statistics, geography, political science, marketing, economic geography, city planning

and finance.

2. "Behavioral Science" refers to any science that studies the behavior of man and lower animals in their physical and social environment by experimental and observational methods. Psychology, sociology, and anthropology are the designated behavioral sciences in this study.
3. "Subjects" as used in this study refer to those persons listed in the ninth edition of American Men of Science - The Social and Behavioral Sciences, Volume III.

Method of Research.--The descriptive survey method of research utilizing the specific techniques of content analysis and statistical interpretation was used in collecting and interpreting the data requisite for this research.

Locale of the Study.--This research was conducted at Atlanta University, Atlanta, Georgia utilizing the facilities of the Trevor Arnett Library from June, 1962 to August, 1963.

Description of the Subjects.--The subjects used in this study included 3900 of the 25,000 persons listed in the biographical directory, American Men of Science - The Social and Behavioral Sciences edited by Jaques Cattell in 1956. This directory includes sketches of eminent men and women who have met the following requirements, they have achievement equal to the attainment of a doctorate, they have research activity of a high quality, or they hold a responsible position requiring scientific training and experience.[1]

Description of Research Material.--The data used in this research was obtained from the largest biographical directory in the world, American Men

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[1] Graham DuShane, "Among the Missing", Science, CXXX (July, 1959), 193.

of Science, which has been published in ten editions, 1906-1960. This directory had its beginning as a manuscript reference list for the Carnegie Institution of Washington, and was first edited by J. McKeen Cattell, then professor of Psychology at Columbia University and editor of Science, who in 1903 undertook to prepare a list of the 1,000 most significant scientists in research in America. The first volume (1906) contained 4,000 entries and it is estimated that the 1959-62 edition will contain approximately 120,000 entries. The volumes containing the Physical and Biological Sciences of the tenth edition were not published until late in 1962. Therefore, for the purpose of this study the ninth edition was used. It contains 95,000 entries and is published in three volumes: I. The Physical Sciences, II. The Biological Sciences, and III. The Social and Behavioral Sciences. Since the death of Cattell in 1944, American Men of Science has been edited by his son, Jaques Cattell. It is generally recognized that the directory has become more useful in scientific circles than any other reference book.

Research Procedure.--The procedural steps used in conducting this research were:

1. The related literature pertinent to this study was reviewed.
2. The biographical directory, American Men of Science, was used to obtain the data needed for this research.
3. The data derived from this directory was assembled in appropriate tables and statistically treated as indicated by the nature of the data and the expressed purposes of the study.
4. The data assembled in the tables was statistically treated through the computation of these measures: range, mean, and frequency counts.
5. The findings, conclusions, implications, and recommendations stemming from the analysis and interpretation of the data is presented in the third chapter of the thesis.

Survey of Related Literature

Introduction.--The literature reviewed in connection with this study revealed that a number of studies had been done on American Men of Science prior to the last two decades. Recently a number of studies have been done on dividuals earning Ph. D.'s, with the assumption that an examination of the early lives of the degree recipients may provide valuable clues as to the factors which led to such success. Researchers generally agree that social conditions and freedom to do work are the most important factors in producing scientific scholars. The related literature for this study will be presented under the following headings: (1) Former Studies of American Men of Science; (2) Backgrounds and Traits of Persons Earning Ph. D.'s and (3) Heredity and Environment as Related to Eminence.

Former Studies of American Men of Science.--These studies show a statistical analyses of the background and personal characteristics of eminent men in the sciences.

In 1906 J. McKeen Cattell made a study of the geographical distribution of one thousand American scientists which also included their universities of origin and their present university affiliation.[1] He found that in general the North Atlantic States produced the most scientists and the South Central States the least. Cattell believed that the main factor in producing scientific and other forms of intellectual performance seemed to be the density of population, wealth, opportunity, institutions and social traditions, and ideals. The present residence of the one thousand scientists was somewhat similar to their origins with California and Washington, D. C. making the greatest gain. The concentration of scientists in cities was also

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[1] J. McKeen Cattell, "A Statistical Study of American Men of Science III. The Distribution of American Men of Science," Science, XXIV (December, 1906), 732-42.

demonstrated. About three-fourths of the one thousand were found to live in 39 places. The birth rates of scientists in urban areas were found to surpass rural areas. The distribution of scientists among various universities and research agencies revealed that Harvard led in the number of scientists employed, followed closely by Columbia and Chicago. It was found that those who did graduate work at institutions where they did not take a A. B. degree were higher in standing than the average A. B. or Ph.D.

In 1910, Cattell did " A Further Statistical Study of American Men of Science" which was a revision of the 1906 study with additions to and deletions from the original list of scientists.[1] The findings were as follows:

1. The major changes noted in the distribution of birthplaces indicated that the North Atlantic States had lost "seriously" in the production of scientists, while the North Central States had gained in every case except Illinois. The large cities had lost ground in their production rate.

2. The Western States tended to add to the men that they had produced, while the South lost its men.

3. In reviewing the education of the one thousand men, it was found that a larger proportion of the new men included in the study held university degrees than was true of those first selected. Harvard, John Hopkins and Chicago had the best record in conferring degrees, while The University of Pennsylvania had the worst.

4. Their ages ranged from 30 to 45 with an average age of 38.1 for those added to the list; only six men under the age of 30 appeared on the list.

This report by Cattell represented a continuation and refinement in the statistical analysis of changes from 1903 to 1906.[2] He noted that there

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[1] J. McKeen Cattell, "A Further Statistical Study of American Men of Science," Science, XXXII (November, 1910), pp 633-48.

[2] Ibid., 672-88.

was an increase in average ages as one goes up the list to the highest ranked men, and that the average age for 1910 was somewhat greater than 1903. Nearly three-quarters of the men listed earned their living by teaching. Another 10 per cent were engaged in work with the government; only six per cent earned their living by direct application of science. Women neither increased or decreased their standing from 1903 to 1910. Cattell felt that this was the result of a lack of encouragement and sympathy not given to these women. The men were found to be more equally and widely distributed over the country than those in the first study.

An article by Cattell in 1917 presented marriage and fertility data for the one thousand outstanding men of science selected in 1903. The article revealed that 10.5 per cent were unmarried. The scientists were somewhat older when they married than were their fathers at the time of their own marriages. The median ages were 28.4 and 26.8, respectively. In addition, the wives of the scientists were somewhat older at marriage than were their mothers, their median ages being 25.6 and 22.3, respectively. The families from which the scientists came had, on the average, 4.7 children. In contrast those scientists who were married and whose families were complete averaged only 2.3 children. American born scientists had fewer children than English and German born scientists. Distribution of family sizes by the types of institutions in which the scientists were employed revealed that those working in small state institutions came from the largest families and they themselves had more children than scientists working elsewhere. Government workers and those employed by larger universities had the smallest number of children.[1]

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[1] J. McKeen Cattell, "Families of American Men of Science. Marriage and Number of Children," Scientific Monthly, IV (March, 1917), 248-62.

The fourth edition of American Men of Science reported the following distribution of 250 men starred for the first time and 1,000 starred in the first edition. Eighty four per cent were born in the United States primarily in the North Atlantic and North Central States. Similarly the majority of the states seemed to have lost ground in both production and residents. Illinois increased the production and the number of eminent scientific residents more than any other state. Analysis of the group by university from which the degree was received indicated that Harvard was far ahead of all others with respect to the bachelor's degrees. Chicago, Harvard, and Columbia led in the number of Ph. D. degrees granted. Cattell observed that the eastern universities were losing their influence. An occupational analysis of the group showed that, while the majority still earned their livings at teaching, there had been a definite increase in the number working in research and industrial laboratories. Harvard, Chicago, and Carnegie led in the employment of scientists.[1]

The last study reviewed by the writer concerned the distribution of American Men of Science in 1933. The number of scientists contributing to the distribution by the various sciences ranged from 111 anthropologists to 2,561 chemists. The proportion of women varied from 2.1 per cent in physics to 22 per cent in psychology. In general the North and Atlantic states lost in both production and residents from the first to the fifth edition. The North Central and Western states gained in both respects. Harvard, Columbia, and Chicago led in the number of degrees granted and

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[1] J. McKeen Cattell, "The Distribution of American Men of Science in 1927," American Men of Science, eds. J. McKeen Cattell and J. Cattell (4th ed. New York: Science Press, 1927), pp. 1118-29.

Harvard, Chicago, California and Yale led in the number of the new group that they employed.[1]

Background and Traits of Persons Earning Ph. D.'s.--A number of studies were examined which dealt with the backgrounds of persons who had earned doctorate degres. If it can be assumed that the mark of academic success which may signify intellectual leadership, is the earning of a doctorate degree, then an examination of the early lives of the degree recipients might provide valuable clues as to the factors which led to such success.

Strauss made a study of 648 Ph. D.'s who had attended 482 known secondary schools located in all but two of the states,in this country. The median I. Q. of this group of Ph. D.'s was 120. Two thirds of this group were below the top 5 per cent of their high school graduating class and half of the subjects below the top 10 per cent of their class. It was found that large high schools are more productive of Ph. D.'s. All elements of the country's population seemed to have contributed doctorates to the group, although a disportionate number came from professional fathers, they did not constitute the preponderant group that former studies had revealed. The social scientist and the humanist were definitely older than the natural scientists when they received their degrees. Strauss offered the following reasons for these differences: (1) that the natural sciences may not require as much maturity to understand, (2) training in the natural sciences begins at a lower level in our schools, (3) a substantial number of scholars in the social sciences and humanities switched from a previous interest in the natural science and the change required more time.[2]

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[1]J. McK. Cattell, "The Distribution of American Men of Science in 1932", American Men of Science, eds. J. McK. Cattell and J. Cattell (5th ed. New York: Science Press, 1933), pp. 1261-78.

[2]Samuel Strauss, "High School Backgrounds of Ph. D.'s," Science Education, XXXXIV (February, 1960), 45-51.

An important study of high school backgrounds of 6,259 science doctorates was made by the Office of Scientific Personnel, National Research Council. The findings indicate that there are factors quite unrelated to later attainment of the doctorate that are more heavily involved in rank in high school than they are in intelligence test performance. This is particularly apparent in the social science field. This study showed that the physical and social sciences are outstanding fields at higher ability levels, followed closely by arts and humanities, with biological sciences and education lagging far behind. In the case of social sciences, it seemed much more likely that urban concentration, with the multiplicity of social problems, is a strong factor in the decision of students in large urban schools to enter social sciences.[1]

Strauss and Brechbill conducted a study which involved 60 men who had earned the Ph. D. degree in the biological or social sciences using the technique of interview. From the evidence presented it may be fairly concluded that in respect to the two groups of men, they were much more alike than they were different and that most of the traits found were common to scholars. The biologists averaged 33.1 years of age while the social scientists were 35.9 years old. The biologists required an average of 8.7 years between earning the bachelor's and the doctorate degrees, while the social scientists took an average of 12.5 years. The social sciences require greater maturity on the part of their practitioners than do the natural sciences. The men in the present study show a smaller proportion of scientists originating from professional fathers and a larger number coming from

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[1] Lindsey R. Harmon, "High School Backgrounds of Science Doctorate," Science, XXXXIII (March, 1961), 679-88.

fathers in business and in skilled labor. The social scientists seemed to find their research work less grueling, while the biologists needed a stronger drive to enable them to persist through the details of their research work. The scientists investigated gave no evidence of any peculiar personal characteristics. They reported that they enjoyed social contacts, were greatly influenced by other people, attended church, resented being pushed around, sought varied recreation, and seemed generally to be what may be regarded as normal human beings. The social scientists appeared to be more sensitive to the opinions of other people and made a greater effort to please them. According to the investigators, one of the most far-reaching conclusions to be drawn from the study is that the great middle group of students neither high nor low in parentage, intelligence, and school marks, should not be over looked in the search for potential scientists and other scholars.[1]

Wolfle and Oxtoby did a study which revealed how students who choose one field of specialization resemble or differ from one another. It gives a comparison of different groups in terms of their distribution of scores on the AGCT. The data concerning Ph. D. degrees was limited to students in the sciences who had earned the degree since 1940 and whose undergraduate work had been done in an Ohio or Minnesota College. The findings indicated that the average person earning a bachelor's degree earned a score of about 126 on the AGCT, graduate students make a score of 129, and Ph. D.'s in the sciences make a score of approximately 138. Only about 2 per cent of the population will make a score as high as that. According to the study students specializing in psychology and the social sciences earned scores which

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[1] Samuel Strauss and Harry Bechbill, "Traits of Scientists," Science Education, XXXXIII (February, 1959), 35-41.

ranged from 128 for A. B. degrees to 142 for the Ph. D. The social science majors made scores on the AGCT which ranged from 123-127 for A. B. degrees. An analysis of the data also indicated that students who major in psychology have higher AGCT scores than those in the social studies, while students in the natural sciences earn higher AGCT scores than any other group.[1]

Roe designed a study to investigate the existence of the relationships between life history, intellectual functions or personality characteristics, and the selection and pursuit of a particular science as a profession. This study was conducted with a group of psychologists and anthropologists who had been selected by their peers for eminence in research. All were men under 61 years of age and American-born. The average age of the psychologists was 49.5. With regard to background data about half of the group had fathers who were in the professions. More of the anthropologists came from well-to-do families than did the psychologists. She found that these social scientists had a higher rate of divorce when compared with biologists. In both groups, the experience of doing research was an important factor in vocational choice. They showed patterns of interaction with their parents involving over-protection, firm control and rebelliousness. Heterosexual interests developed considerably earlier in the social scientists, while shyness was a greater problem for the physicists and biologists. Results on the T. A. T. indicated that psychologists had a considerably higher incidence of unhappy, tense, and anxious tones than did the anthropologists, who had more recourse to the melodramatic and sardonic. For both of these groups, interpersonal relations were more frequently pictured as formal than as

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[1] Dael Wolfle and Tobey Oxtoby, "Distribution of Ability Students Specializing in Different Fields," Science, CXVI (September, 1952), 311-14.

emotional. The social scientists were freer in the expression of aggresive attitudes than were the biologists. Certain differences were found in imagery: biologists and experimental physicists tending to depend more upon visual imagery in their thinking; theoretical physicists and social scientists depending more on verbalization and similar symbolization. In the discussion of results, the author points to the intellectualization of interests which was facilitated by the value which scientists' families placed on learning, the importance of the need to achieve and maintain independence, the feeling of separateness from others, and the curiosity, all of which influenced their choice of research. Although many were not well adjusted by a psychologists definition (which includes warm personal relations as of central importance) she found that most of them were well adjusted in the larger sense of being socially useful and happy in their work.[1]

Heredity and Environment as Related to Eminence.--The roles of heredity and environment in determing individual creativety have been the focus of much research. Cattell stressed that there was an interaction of these two factors that determines greatness. Outstanding among the preponents of the hereditary determination was Francis Galton.

Galton maintained that mental capacities are hereditary, that they follow the laws of organic transmission and that these laws can be ascertained by careful observation. In studying the eminent relations of 65 scientific men, Galton found the group distinguished from those previously studied in three ways. Fewer of the fathers and grandfathers of the scientist were themselves eminent, the female line of inheritance was more marked,

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[1]Anne Roe, "A Psychological Study of Eminent Psychologists and Anthropologists, and a Comparison with Biological and Physical Scientists," The Psychological Monographs, LXVII, No. 2 (1953).

and a greater proportion of the sons of the most gifted became distinguished in their fathers' field than was true among the judges, statesmen, or literary men. Galton suggested that the mother is of particular importance in determining an eminent scientific career since it is she who teaches the son his basic attitude toward reality. She may either teach him an unquestioning acceptance of dogmatism or an attitude of inquiry and love of truth. Comparing the results of the various groups studied, Galton found that: The general uniformity in the distribution of ability among the kinsmen in the different groups is strikingly manifested. The eminent sons are almost invariably more numerous than the eminent fathers. There is a sudden dropping off of the numbers at the second grade of kinship, another abrupt dropping off in numbers is again met with, but the first cousins are found to occupy a decidedly better position than other relations within the third grade. From these results, Galton estimated the chances that a given relative of any of the most illustrious men will achieve eminence as follows: The chance of a father is 1 in 6; of a brother, 1 in 7; of each son, 1 in 4; of each grandfather, 1 in 25; of each uncle, 1 in 40; of each nephew, 1 in 40; of each grandson, 1 in 29. For all more remote relatives the chances are about 1 in 20, except for first cousins whose chances are about 1 in 100. Galton stated that eminent men are the offspring of good marriages and not just good parental stock. In his observations of the contributions of his eminent population, he concluded that "the gifted men consisted of two categories - the very weak and the very strong." The mortality curves were bi-modal, one group of men dying quite young and another at a much later date. The scientists lived longer than any group and had decidely fewer early deaths

than the others.[1]

One of the purposes in a study by Cox was to answer the question, "What was the hereditary background of a group of young persons who later achieved very great distinction and what contribution was made by early environment to the development. She concluded that:

> Youths who achieve eminence have in general (a) heredity above the average, and (b) superior advantage in early environment. It appeared that while an individuals' chances for eminence are usually dependent upon a favorable hereditary background and are usually dependent upon a favorable opportunity, eminence is not a function either of heredity or of environment.[2]

Terman's follow-up of geniuses after twenty-five years showed that some 50 of them now have listing in American Men of Science or Who's Who. These geniuses now had a mean age of 25.4 years.

Recapitulation on the earlier life of these geniuses showed that despite many exceptions the typical gifted child was the product of superior parents not only in culture and educational background but in heredity.[3]

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[1] Hereditary Genius, summarized by Morris I. Stein and Shirley J. Heinze, Creativity and the Individual (Glencoe, Illinois: The Free Press, 1960), pp. 88-89.

[2] L. M. Terman, Genetic Studies of Genius, Volume II: The Early Mental Traits of Three Hundred Geniuses, by Catherine Cox (Stanford California: Stanford University Press, 1926).

[3] L. M. Terman and Melita H. Oden, The Gifted Child Grows Up: Twenty-Five Years' Follow Up of A Superior Group (Stanford California: Stanford University Press, 1949), 373.

CHAPTER II

PRESENTATION AND ANALYSIS OF DATA

Presentation and Treatment of Data.--The data concerning the 3,900 subjects of the present study are presented in tabular and textual forms in the pages which follow. The purposes of this study were answered in terms of data obtained from the biographical directory, American Men of Science, Volume III, edited by Jacques Cattell in 1956.

As will be noted, some of the biographical sketches of the subjects were not complete, as they did not in all cases include the years that they earned each degree, the names of the institutions awarding the degree, or sometimes their date or place of birth. Therefore, a number of points throughout the study will not show totals for 3,900 subjects.

It must be remembered in interpreting the tables on regional distribution, that there have been general population migrations over the ninety-six years span covered by these data, and that such population shifts must also have pronounced effect on that segment of the general population which eventually becomes listed in American Men of Science. The information which might be derived from these tables that would be most significant for education would be the net change in these figures over and above the general population shifts. Such analysis, however, goes beyond the scope of the present study.

State and Regional Distribution of the Subjects Birthplaces.--In

Table 1, are given the birthplaces of the subjects. The table reveals that the subjects were born throughout the fifty states, Puerto Rico, Canada and many foreign countries. Persual of the data presented in

TABLE 1

STATE AND REGIONAL DISTRIBUTION OF SUBJECTS' BIRTHPLACES

State and Region	Frequency	Per Cent
New England	299	7.79
Maine	25	.65
New Hampshire	15	.39
Vermont	19	.49
Massachusetts	168	4.48
Rhode Island	18	.47
Connecticut	54	1.41
Middle Atlantic	869	22.64
New York	542	14.12
New Jersey	84	2.19
Pennsylvania	243	6.33
East North Central	785	20.46
Ohio	233	6.07
Indiana	128	3.33
Illinois	247	6.45
Michigan	105	2.73
Wisconsin	72	1.88
West North Central	532	13.86
Minnesota	93	2.42
Missouri	113	2.94
North Dakota	21	.55
South Dakota	24	.63
Nebraska	75	1.95
Kansas	79	2.06
Iowa	127	3.31

TABLE 1 - Continued

State and Regional	Frequency	Per Cent
South Atlantic	295	7.68
Delaware	6	.16
Virginia	86	2.24
Maryland	29	.75
District of Columbia	25	.65
West Virginia	31	.81
North Carolina	49	1.28
South Carolina	25	.65
Georgia	27	.70
Florida	17	.44
East South Central	139	3.62
Kentucky	54	1.41
Tennessee	37	.96
Alabama	27	.60
Mississippi	25	.65
West South Central	169	4.40
Arkansas	21	.55
Louisiana	19	.49
Oklahoma	28	.73
Texas	101	2.63
Mountain	129	3.35
Montana	8	.21
Idaho	17	.44
Wyoming	9	.23
Colorado	44	1.15
New Mexico	4	.10
Arizona	2	.05
Utah	43	1.12
Nevada	2	.05
Pacific	195	5.08
Washington	65	1.70
Oregon	34	.89
California	93	2.42
Alaska	1	.02
Hawaii	2	.05
Puerto Rico	4	.10

Table 1 - Continued

State and Regional	Frequency	Per Cent
United States	1	.02
Canada	105	2.73
Foreign	317	8.26
Total	3839	99.99

Table 1 indicates that 43.10 per cent of the subjects were born in the Middle Atlantic and East North Central States. Five hundred forty-two or 14.12 per cent of the subjects listed New York as their place of birth. The Mountain States produced the smallest number of the subjects of this study, 129 or 3.35 per cent. The state with the smallest per cent of subjects reporting it as a place of birth was Alaska with .02 per cent. Four subjects or .10 per cent listed Puerto Rico as a place of birth, and one subject listed only the United States. One hundred five subjects or 2.73 per cent were Canadian born, and 317 subjects or 8.25 per cent were foreign born. These data tend to correlate highly with Catell's findings in his last study made in 1933, that the Middle Atlantic and North Central States are still leading in the production of American Men of Science.

Distribution of American Subjects According to Population of Birthplace, 1960.--Table 2, page 26, reveals the distribution of the American born subjects according to the population of their birthplaces as given in the 1960 census. Of the 3417 native to the United States, 1,356 or 39.68

TABLE 2

DISTRIBUTION OF AMERICAN SUBJECTS ACCORDING TO POPULATION OF BIRTHPLACES, 1960

Population	Frequency	Per Cent
1,000,000 or more	512	14.98
500,000 to 1,000,000	320	9.36
250,000 to 500,000	237	6.94
100,000 to 250,000	287	8.40
50,000 to 100,000	273	7.99
25,000 to 50,000	209	6.12
10,000 to 25,000	315	9.22
5,000 to 10,000	259	7.58
2,500 to 5,000	202	5.91
1,000 to 2,500	331	9.69
500 to 1,000	158	4.62
Less than 500	236	6.91
Town Not Listed in 1960 Census	16	.46
Listed State Only or U. S. Puerto Rico	58	1.70
Total	3417	99.99

per cent were born in the cities which in 1960 had a population of more than 100,000. According to the present population, 927 or 21.13 per cent

were born in rural areas. Sixteen of the subjects were born in towns which were not listed in the 1960 census. It is quite possible that these towns have been incorporated with nearby cities. Fifty-eight of the subjects listed only the state in which they were born.

These data, conclusively, reveal that the urban areas have led in the production of these scientific men, with 1,629 or 47.67 per cent being birthplaces as of 1960 over 50,000.

State and Regional Distribution of the Subjects Residences.--In Table 3, the residences of the subjects are listed. The subjects are located throughout forty-nine of the fifty states, Puerto Rico, Canada, and many foreign countries. The table reveals that the greatest number of subjects, 848 or 21.75 per cent are living in the Middle Atlantic States. The East

TABLE 3

STATE AND REGIONAL DISTRIBUTION OF SUBJECTS' RESIDENCES

State and Region	Frequency	Per Cent
New England	355	9.10
Maine	24	.62
New Hampshire	25	.64
Vermont	14	.36
Massachusetts	184	4.72
Rhode Island	15	.38
Connecticut	93	2.38
Middle Atlantic	848	21.75
New York	549	14.08
New Jersey	118	3.03
Pennsylvania	181	4.64

TABLE 3 - Continued

State and Region	Frequency	Per Cent
East North Central	741	19.00
Ohio	187	4.79
Indiana	86	2.21
Illinois	230	5.90
Michigan	162	4.15
Wisconsin	76	1.95
West North Central	279	7.15
Minnesota	74	1.90
Missouri	80	2.05
North Dakota	6	.15
South Dakota	9	.23
Nebraska	27	.69
Kansas	43	1.10
Iowa	40	1.03
South Atlantic	729	18.69
Delaware	9	.23
Virginia	131	3.36
Maryland	125	3.20
District of Columbia	237	6.08
West Virginia	24	.62
North Carolina	54	1.38
South Carolina	21	.54
Georgia	43	1.10
Florida	85	2.18
East South Central	155	3.97
Kentucky	45	1.15
Tennessee	60	1.54
Alabama	39	1.00
Mississippi	11	.28
West South Central	204	5.23
Arkansas	22	.56
Louisiana	31	.79
Oklahoma	38	.98
Texas	113	2.90

TABLE 3 - Continued

State and Region	Frequency	Per Cent
Mountain	108	2.77
Montana	5	.13
Idaho	9	.23
Wyoming	4	.10
Colorado	41	1.05
New Mexico	12	.31
Arizona	16	.41
Utah	19	.49
Nevada	2	.05
Pacific	393	10.07
Washington	40	1.03
Oregon	36	.92
California	311	7.97
Alaska	0	0.00
Hawaii	6	.15
Puerto Rico	4	.10
Canada	51	1.31
Foreign	33	.85
Total	3900	99.99

North Central States rank second with 741 or 19 per cent of the subjects residing there, followed by the South Atlantic States with 729 or 18.69 per cent of the subjects. The state of New York has the greatest number of residents for one state. Five hundred forty-nine or 14.08 per cent of the subjects reside in New York. The states in the mountain region have the smallest per cent, 2.77 of the subjects living there. No subjects reported Alaska as a place of residency. Four subjects are now living in Puerto

Rico; fifty-one or 1.31 per cent are residents of Canada; and thirty-three or .84 per cent are residing in foreign countries.

It is interesting to note that the present residence of the subjects is similar to their origins with California and Washington, D. C. making the greatest gains.

There seems to be some relationship between the geographical centering of the subjects and the choice of their vocation. Almost 75 per cent live outside the south.

Distribution of American Subjects According to Population of Residences, 1960.--In Table 4 is the distribution of subjects now residing in the United States and its outlying territory, Puerto Rico, according to the 1960 census. One thousand seven hundred sixty or 47.31 per cent of the subjects are now living in United States cities that have populations

TABLE 4

DISTRIBUTION OF AMERICAN SUBJECTS ACCORDING TO POPULATION OF RESIDENCES, 1960

Population	Frequency	Per Cent
1,000,000 or more	460	12.05
500,000 to 1,000,000	541	14.18
250,000 to 500,000	249	6.53
100,000 to 250,000	517	13.55
50,000 to 100,000	428	11.22
25,000 to 50,000	551	14.44
10,000 to 25,000	519	13.60

TABLE 4 - Continued

Population	Frequency	Per Cent
5,000 to 10,000	197	5.16
2,500 to 5,000	130	3.41
1,000 to 2,500	152	3.98
500 to 1,000	31	.81
Less than 500	32	.84
Listed State Only	2	.05
Town Not Listed in 1960 Census	3	.08
Puerto Rico	4	.10
Total	3816	100.00

of 100,000 or more. Three hundred forty-five or 9.04 per cent of the subjects are living in rural areas. Two subjects listed only the state of residency, and three subjects listed towns that were not included in the 1960 census. It is quite possible that these towns have been incorporated with others or their names may have been changed.

These data support the conclusion that the subjects of the present study tend to be concentrated in large cities, almost 50 per cent live in cities whose population in 1960 was over 50,000.

Birthyears of the Subjects.--Table 5, page 32, presents the birthyears of the subjects divided into five year periods. The periods range from 1928 through 1867 in order to include all of the subjects' dates of birth.

TABLE 5

BIRTHYEARS OF THE SUBJECTS

Distribution of Subjects' Birthyears	Frequency	Per Cent
1863 - 1867	1	.03
1868 - 1872	10	.26
1873 - 1877	25	.66
1878 - 1882	44	1.16
1883 - 1887	94	2.48
1888 - 1892	163	4.30
1893 - 1897-	234	6.17
1898 - 1902	370	9.78
1903 - 1907	449	11.86
1908 - 1912	533	14.07
1913 - 1917	625	16.50
1918 - 1922	669	17.67
1923 - 1927	500	13.20
1928 - 1932	70	1.84
Total	3787	99.98

The four periods 1923-1927 through 1908-1912 were the birthyears of 61.44 per cent of the subjects. There are nine five year periods that the per

cent did not exceed or reach 10 per cent. The periods with less than one per cent of the subjects included are the periods 1863-1867 through 1873-1877. Seventy subjects or 1.84 per cent were born during the period 1928-1932.

1962 Chronological Ages of the Subjects.--Table 6 lists the chronological ages of 3,787 of the subjects. The biographical sketches did not

TABLE 6

1962 CHRONOLOGICAL AGES OF THE SUBJECTS

Distribution of the Subjects' Ages	Frequency	Per Cent
95-99	1	.03
90-94	10	.26
85-89	25	.66
80-84	44	1.16
75-79	94	2.48
70-74	163	4.30
65-69	234	6.17
60-64	370	9.78
55-59	449	11.86
50-54	553	14.07
45-49	625	16.50
40-44	669	17.67
35-39	500	13.20
30-34	70	1.84
Total	3787	99.98
Mean - 51.73		

list the date of birth for 113 of the subjects. The subjects range in present age from thirty to ninety-six. The mean age of the group is 51.73. It can be seen that 49.21 per cent can give twenty or more years of service in his or her profession. If the subjects adhere to the compulsory retirement age, about 41.88 per cent will be retiring or have retired in the next twenty years. One can reasonably assume that about 8.89 per cent of the subjects have already retired.

It can be concluded that the average subject of the present study is in the period of middle adulthood and beyond the period of greatest productivity in writing and research.

Marital Status of the Subjects.--Table 7 gives the marital status of the subjects. At the time that the data were collected for the directory, only six or 0.15 per cent of the subjects were widowed, and eighteen

TABLE 7

MARITAL STATUS OF THE SUBJECTS

Status	Frequency	Per Cent
Married	2875	73.72
Single	1001	25.67
Widowed	6	0.15
Divorced	18	0.46
Total	3900	100.00

or 0.46 per cent were divorced. One thousand one or 25.67 per cent were still single while 2,875 or 72.72 per cent were married. These findings correlate highly with the study by Harmon and Soldz who studied the behavioral science doctorates of 1958 and 1959 and found that seventy-seven per cent were married and 23 per cent were single.

It should be pointed out that there may be some divorce cases hidden in the data, since only present marital status was given.

Age at Marriage of the Subjects.--Table 8 lists the age at marriage of the subjects. Some of the subjects listed the marital status but did

TABLE 8

AGE AT MARRIAGE OF THE SUBJECTS

Subjects' Ages at Marriage	Frequency	Per Cent
65-69	1	.03
60-64	1	.03
55-59	6	.21
50-54	14	.49
45-49	34	1.19
40-44	70	2.46
35-39	163	5.72
30-34	493	17.30
25-29	1215	42.62
20-24	836	29.32
15-19	18	.63
Total	2851	100.00
Mean	27.72	

not include the year. Of the 2,851 subjects reporting the year, the mean age at which they were married was 27.72. The marital age ranged from sixteen to twenty-five. Over 40 per cent got married between the ages of twenty-five through twenty-nine. Less than one per cent of the subjects were married after the age of fifty. Table 8 also reveals that 18 or .63 per cent of the subjects were married before they were twenty.

These data support the conclusion that, in the main Social and Behavioral Scientists tend to marry later than the average person. The average age for first marriages in 1960 was 21.5. It is also little likelihood that if they are not married by fifty they will not marry.

Number of Children Presently in the Family of Subjects.--Table 9 gives the number of children in the immediate family of each subject. The

TABLE 9

NUMBER OF CHILDREN PRESENTLY IN THE FAMILIES OF THE SUBJECTS

Number of Children the Subjects Have	Frequency	Total	Per Cent
0	696	0	24.00
1	607	607	20.94
2	894	1788	30.84
3	463	1389	15.98
4	179	716	6.17
5	42	210	1.45
6	10	60	.34
7	7	49	.24
12	1	12	.03
Total	2899	3831	99.94
Average	1.32		

total number of children is 3,831. When the married subjects are considered as a group, the mean number of children per subject is 1.32. Among those subjects who have children the range in number of children is from a low of one to a high of twelve with the modal number being two. At the present time 696 or 24 per cent of the subjects have no children at all. There are 249 or 8.23 per cent of the families that contribute more than four children. From these data it can be seen that biographees in the Social and Behavioral Sciences of American Men of Science tend to have few, if any children. It should be noted, however, that some subjects who do not presently have children may have them, while those who have at least one child might possibly have more in the future.

Subjects' Fields of Specialization.--Table 10 reveals the fields of specialization of the 3,900 subjects. Some subjects listed two fields of

TABLE 10

THE SUBJECT FIELDS OF SPECIALIZATION

Field	Frequency	Per Cent
Accoustics	2	.05
Accounting	13	.33
Actuarial Science	4	.10
Agriculture	1	.02
Agricultural Economics	115	2.94
American-Foreign Relations	1	.02
Anthropology	150	3.84

TABLE 10 - Continued

Field	Frequency	Per Cent
Audiology	1	.02
Automation	1	.02
Banking	2	.05
Biometrics	3	.07
Bio-Statistics	7	.18
Business Administration	86	2.20
Business Education	1	.02
Business Law	1	.02
Child Development	5	.13
Clinical and Social Psychology	84	2.15
Communications	3	.07
Community Banking	3	.07
Criminology	2	.05
Cultural Anthropology	11	.28
Demography	7	.18
Developmental Psychology	1	.02
Economics	960	24.61
Ecomomics Geography	4	.10
Economic Research	1	.02
Economics Statistics	2	.05
Educational Administration	1	.02
Educational Psychology	57	1.46
Education	43	1.10

TABLE 10 - Continued

Field	Frequency	Per Cent
Ethnology	2	.05
Experimental Psychology	27	.70
Family Relations	1	.02
Farm Management	1	.02
Finance	49	1.25
Forest Economics	7	.18
Forestry	1	.02
Geography	175	4.50
Gerontology	1	.02
Government	42	1.08
Group Dynamics	1	.02
Guidance	4	.10
History	12	.30
Home Economics	1	.02
Housing	5	.13
Human Development	1	.02
Human Engineering	2	.05
Human Relations	5	.13
Industrial Economics	2	.02
Industrial Relations	11	.28
Industrial Psychology	7	.18
International Relations	31	.79

TABLE 10 - Continued

Field	Frequency	Per Cent
Inter-Group Relations	1	.02
Insurance	2	.05
Labor Economics	7	.18
Law	15	.38
Labor Relations	4	.10
Marketing	52	1.33
Mathematics	6	.15
Mathematical Economics	1	.02
Management	22	.56
Modern Politics	1	.02
Physiological Psychology	5	.38
Planning	1	.02
Political Economics	5	.38
Political Science	350	8.97
Political Theory	1	.02
Psychoanalysis	3	.07
Psychotherapy	1	.02
Psychology	942	24.15
Public Administration	27	.70
Public Law	1	.02
Public Welfare	1	.02
Real Estate	1	.02
Resource Management	1	.02

TABLE 10 - Continued

Field	Frequency	Per Cent
Rural Sociology	12	.31
Social Anthropology	10	.28
Social Economics	1	.02
Social Psychology	21	.53
Social Science	39	1.00
Social Welfare	7	.18
Social Work	31	.79
Sociology	311	7.97
Statistics	177	4.54
Special Education	1	.02
Transportation	44	.10
Transportation Economics	22	.05
Vital Statistics	1	.02
Total	4060*	

* Some of the subjects listed more than one field of specialization.

specialization. The subjects have specialized in eighty-nine different fields.

The field of Economics includes the greatest number of subjects, 960 or 24.61 per cent. Psychology ranks second with 942 subjects or 24.15 per cent, followed by Political Science and Sociology with 8.97 and 7.97,

respectively. Rounding out the fields of specialization in which at least one per cent of the subjects have entered are Statistics, Geography, Anthropology, Agricultural Economics, Business Administration, Clinical and Social Psychology, Educational Psychology, Marketing, Finance, Government, Education, and Social Science.

When all of the areas of Psychology and Economics are considered, then the leading field of specialization among the subjects is Psychology, with 29.32 per cent, followed by Economics with 28.17 per cent.

The demand for training in psychology has reached unprecedented proportions. In the year 1959-60 a total of 2,083 earned doctoral degrees were conferred in the social sciences in America. Of the fields concerned, psychology was by far the most popular with 641 doctoral degrees. Economics ranked third with 237 degrees. Thus among the disciplines dealing with the nature of man, psychology is the fashion.

Institutions From Which the Subjects Earned Degrees.--Table 11, page 43, lists the institutions of higher learning that have awarded degrees to the subjects of the present study. Perusal of the data reveals that they have attended the world's leading colleges and universities.

The institution leading all others from which the subjects have earned the bachelor's degree is Harvard, followed by the University of California at Los Angeles and the University of Chicago.

Columbia ranks first in the awarding of the master's degree to the subjects of the present study. The other two leading universities attended for second level degrees by the subjects were Harvard and the University of Chicago.

These data reveal that Harvard ranks first in the conferring of doctorate

TABLE 11

INSTITUTIONS FROM WHICH THE SUBJECTS EARNED DEGREES

American Colleges and Universities

Institution	Bachelors	Masters	Doctorate
Abilene Christian	2		2
Adelphi	2		
Akron University	6	1	
Alabama, University of	9	2	1
Albion	5		1
Albright	1		
Alfred University	2		1
Allegheny	4		1
American Extension School of Law	1		
American University	2	28	22
Amherst	19		1
Antioch	15		
Arizona State College	1		
Arizona State Teachers College	1		
Arizona University	13	7	1
Arkansas Agricultural Normal	1		
Arkansas State Teachers College	1		
Arkansas University	8	3	
Asbury	1		1
Atlanta University		5	
Augustana	3		
Austin	1	1	1
Aurora College	1		
Baker University	2		
Ball State Teachers	2		
Baldwin-Wallace	2		
Bard		1	
Barnard	11	1	
Bates	7		
Baylor	9		
Beloit	11		2
Bemidjii State	2		
Berea	11		
Bethany	1		
Bethel	1		
Birmingham-Southern	4	2	
Blufton	3		
Boston College	5	5	2
Boston University	30	23	9
Bowdoin	6		
Bowling Green	4	2	
Bradley University	2	3	
Bridgewater	1		
Brigham-Young	11	5	2
Brookings Institution			5
Brown University	17	28	22
Bryn Mawr	4	4	6
Bucknell University	5	1	
Buffalo, University of	10	6	1
Butler	2		
Burton	1		
California Institute of Technology	2		
California State Teachers	1		
California University (Berkeley)	3	2	7

TABLE 11 - Continued

Institution	Bachelors	Masters	Doctorate
California University (Los Angeles)	141	126	135
Calvin	5	1	
Canisus	2	1	
Campbell	1		
Capital University	2		
Carleton	7		
Carnegie Institute of Technology	5	2	1
Carroll	1		
Carson-Newman	3		
Case Institute of Technology	1	1	
Catholic University of America	2	19	32
Centenary		1	
Central College (Iowa)	7		
Central College (Missouri)	1		
Central College (Illinois)	1		
Central Michigan University	1		
Central Missouri State (Ohio)	2		
Central Y.M.C.A. College	1		
Central College of Kentucky	1		
Chattanooga	1		
Chapman	1		
Chapman	1		
Chicago Conservatory College	1		
Chicago-Kent Law School	1		
Chicago Teachers College	2		
Chicago University	86	152	258
Chicago State	1		
Cincinnati University	15	10	5
Citadel	2		
Claremont Graduate School		3	1
Clark University	23	44	50
Clemson	4	1	
Colby	2		
Colgate-Rochester Divinity School	2		
Colgate University	11	1	
Colorado A. and M.	1		
Colorado College	2		
Colorado State	10	11	1
Colorado University	15	19	12
Columbia College	6	2	
Columbia University	54	259	31
Connecticut	8	7	
Cornell	19	13	27
Creighton University		1	
Culver-Stockton	1		
Dakota Weslyan	3		
Danbury State	1		
Dartmouth	35	11	
Davidson	3		1
Dayton University	1		
Delaware University	4	2	
Denison University	7	1	1
Denver University	16	18	5
DePauw University	16	1	1
Des Moines	3	1	
Detroit University	2	2	
Dickinson	3		1

TABLE 11 - Continued

Institution	Bachelors	Masters	Doctorate
Dillard University	1		
Doane	4		
Drake University	6	2	
Drew University	1	3	
Drury	1		
Dubuque	1		
Duke University	10	25	36
Duquesne University		1	
D'Youville	1		
Earlham	4		
East Central State College	1		
East Washington College of Education	1		
Eastern Illinois State	3		
Eau Claire Teachers College	1		
Edinboro State	1		
Elizabeth Town	1		
Ellsworth	1		
Elmhurst	1		
Elmira	2		
Elon	1		
Emmanuel Missouri College	1		
Emory University	7	3	
Emporia	5		1
Estonian State University	1		
Eureka	1		
Evansville	2		
Fairmont	1		
Fenn	1		
Findlay	2		
Fisk	4	3	
Fletcher College	1		
Fletcher School of Law and Diplomacy	1	3	1
Florida University	2	3	
Florida State University	19	12	2
Fanthonne	1		
Fordham	9	12	12
Fort Hayes Kansas State	4	3	
Franklin and Marshall	8		
Franklin University	2		
Fresno State	1		
Friends University	1		
Furman	4		
Gallaudet	1	1	
Garrett Biblical Institute	1		2
Geneva	3		
Georgetown	2		
George Peabody	7	17	24
George Washington University	29	21	9
George Williams	3		
Georgetown University	7	4	8
Georgia Institute of Technology	2		
Georgia State Teachers College			1
Georgia Teachers College			1
Georgia University	6	3	
Gettysburg	2	1	
Gonzaga	3	3	
Goshen	1		
Goucher	3		
Grinnell	7		1
Grove City	2	1	
Gustavus-Adolphus	2	1	

TABLE 11 - Continued

Institution	Bachelors	Masters	Doctorates
Hamilton	2	1	
Hamline	4		
Hampden-Sydney	5		
Hampton Institute	1		
Hanover	1	1	
Hardin Simmons	1		
Hartford University	1	1	1
Harvard University	131	247	280
Hastings	6		
Haverford	7	1	
Hawaii	2	2	
Hoildelberg	5		1
Hendrix	2		
High Point	1		
Hillsdale			1
Hiram	7		
Hobart	4		
Hofstra	1		
Holy Cross College	1		
Hope	2		
Houston, University of	2	4	1
Howard College	1		
Howard University	6	3	1
Idaho University	5	2	
Illinois State Normal	9		
Illinois University	62	83	70
Illinois Wesleyan University	6		
Indiana State Teachers College	7	2	
Indiana State Teachers College (Pa.)	9	1	
Indiana University	34	43	28
Iowa State Teachers College	12	2	2
Iowa State College of	15	13	16
Iowa, State University of	37	68	81
Iowa Wesleyan	3		
Jamestown	3		
John Carroll	1		
John Hopkins University	10	13	33
Judson	1		
Juniata	4		
Kalamazoo	6		1
Kansas City, University of	4	4	2
Kansas State College	7	3	
Kansas State Teachers	7	2	
Kansas University	17	18	6
Kansas Wesleyan University	1		
Kent State University	4	2	
Kentucky State	14	14	7
Kentucky University	5	9	3
Kentucky Wesleyan	1		
Kenyon	2		
Kings	1		
Kingfisher	1		
Knox	4	1	1
Lafayette	1		
Lake Forest	4		
La Grange	1		
La Salle	2		
Lawrence	6		1
Lebanon Valley	3		
Lehigh University	1		1
Lenoir Rhyne	2		
Lewis	1		

TABLE 11 - Continued

Institution	Bachelors	Masters	Doctorate
Lincoln Memorial University	2		
Lincoln University (Missouri)	1		
Lincoln University (Pennsylvania)	1		
Linfield	1	1	
Little Rock	1		
Long Island University	6	5	3
Louisiana	6	9	3
Louisville University	3	1	1
Loyola (Maryland)	2	1	
Loyola University (La.)		1	
Loyola University (Ill.)	2	1	1
Lynchburg	4		
Macalester	2		
Maine University	9	4	
Manchester	4		1
Manhattan	2		1
Marietta	5		1
Marion	2	1	
Marionapolis College	1		
Marvin	1		
Marquette University	1		
Marshall University	3		
Marygrove	5		
Maryland, University of	4	4	8
Maryville	4		
Massachusetts Institute of Technology	12	3	9
Massachusetts University	13	2	1
McCormick Theological Seminary	2		
McKendree	2		
McMurry	2		
McPherson	2		
Meadville Tehological Seminary	1		1
Memphis State University	2		
Mercer University	1		
Miami University (Ohio)	12	1	1
Miami University (Florida)	5	2	
Michigan State Normal	2		
Michigan State University	5	12	24
Michigan University	59	87	102
Middlebury	6		
Millersville State	1		
Milligan	1		
Millikin University	2		
Millsaps	1		
Milton	1		
Milwaukee	1		
Minnesota State Teachers	2		
Minnesota University	76	85	81
Misericordia	1		
Mississippi	2		
Mississippi State Teachers College	4	1	
Mississippi State University	4	1	
Missouri State College	1		
Missouri State Teachers College	2		
Missouri University	30	27	11
Missouri Valley	1		
Missouri Wesleyan	2		
Monmouth	2		

TABLE 11 - Continued

Institution	Bachelors	Masters	Doctorate
Montana State	4	3	
Montana State University	2	1	
Moores College	1		
Moravian	3	1	2
Morehouse	4		
Morningside	4		
Morrisville	1		
Mt. Holyoke	8	2	
Mt. Mary	1		
Mt. Saint Mary's	1		
Muhlenberg	3	1	1
Murray State	1		
Muskingum	2		
Nasson	1		
National	1		
Nebraska State College	1	1	
Nebraska State Teachers	3		
Nebraska University	23	27	14
Nebraska Wesleyan	13	20	10
Nevada University	3	1	
New Hampshire University	1	1	
New Jersey Teachers College	1	1	
New Mexico University	8	10	2
New Rochelle College	3		
New School for Social Research	1	5	2
New York Law School	1		
New York University	52	69	82
(Brooklyn)	39	1	
City College	83	13	1
Hunter	5	1	
Queens	4		
New York State University	3		
New York Teachers College	6		1
Newark State	1		
Niagora University	1	1	
North Carolina University	17	31	38
North Carolina State	1	3	1
North Central College	2	1	
North Dakota College	1	1	
North Dakota State	2	1	1
North Dakota State Teachers College	5	1	
North Dakota University	1	3	2
North Mighican School of Education	1		
North Texas State	5	4	
Northeast Missouri State	1		
Northeastern University	2	1	1
Northern Michigan	2		
Northern State Teachers	1		
Northwest Missouri State	1		
Northwestern University	41	69	81
Notre Dame (Maryland)	1		
Notre Dame University	3	1	
Oberlin	42	13	5
Occidental	4	3	1
Oglethorpe University		1	
Ohio Mechanical Institute	1		
Ohio Northern University	3		
Ohio State University	44	86	111
Ohio University	21	11	12
Ohio Wesleyan University	5	2	
Oklahoma A. and M.	12	6	2
Oklahoma, University of	15	10	1

TABLE 11 - Continued

Institution	Bachelors	Masters	Doctorate
Oregon State University	4	7	3
Oregon University	12	11	1
Otterbeim	6		
Pacific College	4	1	
Pacific School of Religion	1		
Paine	2		
Park	4		
Parsons	2		
Pasadena	1		
Penn College	1		
Pennsylvania State University	15	23	24
Pennsylvania, University of	32	57	64
Phillips University	1		
Piedmont College	1		
Paine State College	1		
Pittsburg, University of	19	28	34
Pamona	7	1	
Presbyterian	3		
Princeton University	32	35	42
Puerto Rico, University	2		
Puget-Sound, University of	3		
Purdue University	14	29	40
Quincy		1	
Radcliffe	10	14	13
Redlands, University of	7		2
Reed	10		
Regis	2		
Rhode Island University	1		
Rhode Island State College	1		
Richmond, University of	8	2	
Ripon	1		
River Falls State College	1		
Rochester, University of	7	5	6
Rockhurst	1		
Roosevelt University	1		
Rutgers, The State University	14	6	5
St. Andrews	1	1	
St. Bernard	1		
St. Bonaventure	1		
St. Catherine College of	1		
St. Charles Seminary	1		
St. John's (Maryland)		1	
St. Johns University (Minnesota)	3	1	
St. Johns University (New York)	3		
St. Joseph's College for Women	1		
St. Joseph's (Indiana)	2		
St. Joseph's	1		
St. Lewis University	14	14	5
St. Lawrence	4		2
St. Marys University	1		
St. Michael's College	1		
St. Olaf	5		
St. Patricks Seminary	1		
St. Stephens	1		
St. Thomas Aquinas	1		
St. Victor	1		
St. Vincent	1		
St. Xavier	1		
Salem (North Carolina)	1		

TABLE 11 - Continued

Institution	Bachelors	Masters	Doctorate
Sam Houston State Teachers	4		
Santa Barbara	2		
San Diego State	2		
San Jose State	4		
Savannah State	1		
Scarritt Bible College	1		
Scranton, University of	1		
Scripps	1		
Seattle Pacific	3		
Shaw University	1		
Shelton	1		
Shorter	1		
Simpson College	2		
Smith	4	5	
Sophie Newcomb College	1		
South Carolina	6	2	
South Dakota State University	1	1	
South Dakota State	3		
South Dakota University	2	2	
Southeast Louisiana State	1		
Southeast Missouri State	3		
Southern California University	18	31	28
Southern Illinois University	4		
Southern Methodist University	9	10	1
Southern University A. & M. College	2		
Southwest Missouri State	4		
Southwest Texas State	1		
Southwest Texas Teachers College	1		
Southwestern at Memphis	2		
Southwestern Baptist Theological Seminary	1	2	
Southwestern University	5	1	1
Superior State Teachers College	1		
Springfield	5	1	
Stanford University	38	52	63
Stetson	3	1	
Stevens Institute of Technology	1		
Swarthmore	17		
Syracuse University	28	32	30
Talladega	1		
Tarkio	1		
Temple University	8	1	7
Tennessee, University of	9	13	6
Texas A. and M. College	7	7	
Texas Christian University	4	1	
Texas College	1		
Texas State College for Women	2	1	
Texas State Teachers College	1		
Texas University	39	39	51
Texas Technological	5	4	2
Texas Woman's University	1		
Thiel	1		
Toledo, University of	3		
Transylvania University	1		1
Trinity(Connecticut)	5	3	
Trinity (D.C.)	1		

TABLE 11 - Continued

Institution	Bachelors	Masters	Doctorate
Trinity (North Carolina)	2		
Trinity (Iowa)	1		
Trinity University	3		
Tri-State	1		
Tufts University	6	7	1
Tulane University	9	8	3
Tulsa, University of	2	1	
Tusculum	1		
Union College	1		1
Union Tehological Seminary	2		
Union College and University	5		1
Union University	1		
U.S. Military Academy	6	6	
U.S. Naval Academy	1		
U.S. Merchant Marine Academy	1		
Ursinus	2		
Utah College	1		
Utah State Agricultural College	15	10	
Utah State University	17	18	8
Valparaiso University	3		
Vanderbilt University	4	8	4
Vassar	17	3	
Vermont State Teachers		1	
Vermont, University of	5	3	
Virginia Poly & Technical Institute	4	2	
Virginia Union	1	1	

Institutions	Bachelors	Masters	Doctorate
Virginia, University of	14	21	16
Wabash	7		
Wake Forest	3		
Washburn University	2		
Washington College	1	1	
Washington & Jefferson	4	2	1
Washington & Lee University	8	4	1
Washington State University	66	59	32
Washington University	18	25	20
Wayne State University	8	8	1
Webster	1		
Wellesley	4	1	
Wesleyan	8		
Wesleyan University	14	4	1
West Chester State	1		
West Kentucky State	5		
West Texas State	2		
West Virginia University	8	6	
West Virginia Wesleyan	1		
Western Carolina	1		
Western Illinois University	2		
Western Michigan University	4		
Western Reserve University	12	15	19
Western State Teachers College	2		
Western Theological Seminary	1	1	
Wheaton (Illinois)	2		
Wheaton (Massachusetts)	1		
Whitman	5		
Whittier	1		

TABLE 11 - Continued

Institution	Bachelors	Masters	Doctorate
Wichita, University of	4	2	
Wilberforce University	2		
Williamette University	8	1	
William Jewell	3		
William and Mary	2	1	
Williams	8		
Wilson	2		
Winebrenner School of Divinity		1	
Winthrop	1		
Wisconsin State College	1		
Wisconsin State Teachers	6	6	3
Wisconsin, University of	52	88	64
Wittenberg University	3		
Wofford	2		
Woman's College of Georgia	1		
Woman's College (N.C.)	3		
Woodstock	2	1	
Wooster, Col. of	10	1	
Worchester Polytlchical Institute	1		
Wyoming	9	2	
Xavier University (Ohio)	1		
Yale	69	52	112
Yankton		1	
Yeshiva	1		
York College	1		
Youngstown University	2		

Institution	Bachelors	Masters	Doctorate
Canadian Colleges and Universities			
Arcadia, University of	5	3	2
Alberta, University of	2	1	
British Columbia University	8	3	2
Laval University	3		
McGill University	11	7	5
McMaster University	3		1
Manitoba, University of	6	2	
Montreal, University of		1	2
Mt. Allison University	1		
New Brunswick, University of	2		
Ottowa, University of	2	1	1
Queens University at Kingston	8	2	
St. Joseph's University	1		
Saskatchewan, University	8	4	
Toronto, University of	27	21	8
Western Ontario, University of	4	1	
Foreign Universities Most Frequently Awarding Degrees to Subjects			
Berlin, Free University of	3	1	7
Cambridge	5	4	2
Edinburg	1		4
Frieberg	1		4
Geneva			4
London	9	6	14
Munich			6
Oxford	9	8	4
Oxon		9	4
Vienna	2		12

degrees to these subjects. The University of Chicago and the University of California at Los Angeles rank second and third, respectively.

Canadian and foreign universities have conferred a number of the degrees earned by the subjects of the present study.

The following predominantly Negro colleges and universities have led in the conferring of earned degrees upon the subjects, Howard University, Fisk, Atlanta University, and Morehouse. It is interesting to note that Atlanta University led in the awarding of the master's degree, and Howard University in the number of undergraduate degrees awarded.

State and Regional Distribution of the Institutions From Which the Subjects Received the Baccalaureate Degree.--Table 12 shows the geographical distribution of the institutions which awarded the baccalaureate degree to 3,622 of the subjects. These data support the conclusion that over nineteen

TABLE 12

STATE AND REGIONAL DISTRIBUTION OF THE INSTITUTIONS FROM WHICH THE SUBJECTS RECEIVED THE BACCALAUREATE DEGREE

State and Region	Frequency	Per Cent
New England	482	13.31
Maine	25	.67
New Hampshire	44	1.22
Vermont	12	.33
Massachusetts	284	7.84
Rhode Island	19	.52
Connecticut	98	2.71
Middle Atlantic	670	18.50
New York	450	12.42
New Jersey	51	1.41

TABLE 12 - Continued

State and Region	Frequency	Per Cent
Pennsylvania	169	4.67
East North Central	692	19.10
Ohio	151	4.17
Indiana	112	3.09
Illinois	257	7.09
Michigan	88	2.43
Wisconsin	84	2.32
West North Central	432	11.93
Minnesota	105	2.90
Missouri	97	2.68
North Dakota	12	.33
South Dakota	10	.28
Nebraska	50	1.38
Kansas	46	1.27
Iowa	112	3.09
South Atlantic	276	7.63
Delaware	4	.14
Virginia	53	1.46
Maryland	26	.72
District of Columbia	48	1.32
West Virginia	13	.36
North Carolina	48	1.32
South Carolina	22	.61
Georgia	33	.90
Florida	29	.80
East South Central	138	3.81
Kentucky	46	1.27
Tennessee	52	1.44
Alabama	17	.47
Mississippi	23	.63
West South Central	182	5.02
Arkansas	14	.39
Louisiana	20	.55
Oklahoma	45	1.24
Texas	103	2.84

TABLE 12 - Continued

State and Region	Frequency	Per Cent
Mountain	137	3.78
Montana	6	.16
Idaho	5	.14
Wyoming	9	.25
Colorado	47	1.30
New Mexico	8	.22
Arizona	15	.41
Utah	44	1.21
Nevada	3	.08
Pacific	445	12.23
Washington	147	4.06
Oregon	36	.99
California	260	7.18
Alaska	0	.00
Hawaii	2	.06
Puerto Rico	2	.06
Canada	91	2.51
Foreign	76	2.10
Total	3622	100.00

per cent earned their degree in colleges in the East North Central States, while 670 or 18.50 per cent of the subjects earned their degree in colleges in the Middle Atlantic States. Four hundred fifty or 12.52 per cent of the subjects earned their first degree in colleges in the state of New York. Colleges in the Mountain States awarded the smallest percent of baccalaureate degree to the subjects of this study. Two subjects earned their bachelor's degree in Puerto Rico Colleges, Canadian colleges conferred ninety-one or 2.51 per cent of the bachelor's degrees received by the subjects, while

foreign universities and colleges conferred seventy-six or 2.10 per cent of the degrees.

State and Regional Distribution of the Institutions from Which the Subjects Received the Master's Degree.--Table 13 shows the geographical distribution of the institutions which awarded the master's degree to 3,096 of the subjects. These data support the conclusion that 698 or 22.53 per

TABLE 13

STATE AND REGIONAL DISTRIBUTION OF THE INSTITUTIONS FROM WHICH THE SUBJECTS RECEIVED THE MASTER'S DEGREE

State and Region	Frequency	Per Cent
New England	513	16.56
Maine	4	.13
New Hampshire	12	.39
Vermont	44	1.42
Massachusetts	358	11.56
Rhode Island	28	.90
Connecticut	67	2.16
Middle Atlantic	627	20.25
New York	460	14.86
New Jersey	45	1.45
Pennsylvania	122	3.94
East North Central	698	22.53
Ohio	112	13.61
Indiana	79	2.55
Illinois	311	10.05
Michigan	102	3.29
Wisconsin	94	3.03
West North Central	345	11.15
Minnesota	87	2.81
Missouri	70	2.26
North Dakota	7	.23
South Dakota	4	.13

TABLE 13 - Continued

State and Region	Frequency	Per Cent
Nebraska	49	1.58
Kansas	29	.94
Iowa	99	3.20
South Atlantic	212	6.85
Delaware	2	.07
Virginia	12	.37
Maryland	22	.71
District of Columbia	76	2.45
West Virginia	6	.19
North Carolina	61	1.97
South Carolina	3	.10
Georgia	12	.39
Florida	18	.58
East South Central	72	2.33
Kentucky	24	.78
Tennessee	41	1.32
Alabama	4	.13
Mississippi	3	.10
West South Central	112	3.61
Arkansas	3	.10
Louisiana	19	.61
Oklahoma	27	.81
Texas	63	2.03
Mountain	107	3.47
Montana	4	.13
Idaho	2	.07
Wyoming	2	.07
Colorado	48	1.55
New Mexico	10	.32
Arizona	7	.23
Utah	33	1.07
Nevada	1	.03
Pacific	310	10.08
Washington	71	2.29
Oregon	20	.65
California	219	7.07
Alaska	0	.00
Hawaii	2	.07

TABLE 13 - Continued

State and Region	Frequency	Per Cent
Canada	46	1.49
Foreign	52	1.68
Total	3096	100.00

cent earned their degree in colleges or universities in the East North Central States, while 627 or 20.25 per cent earned their degree in colleges in the Middle Atlantic States. New York colleges awarded the most master's degrees for a single state followed by colleges in Massachusetts. Colleges in the Mountain States ranked last in the awarding of master's degrees to the subjects of the present study. Canada conferred forty-six or 1.49 per cent of the degrees received by the subjects, while foreign universities conferred fifty-two or 1.68 per cent of the master's degrees.

State and Regional Distribution of the Institutions from Which the Subjects Received the Doctorate.--Table 14 shows the geographical distribution of the institutions which awarded doctorate degrees to 2,989 of the subjects. Colleges and universities in the Middle Atlantic and East North Central States have conferred almost fifty per cent of the doctorate degrees granted to the subjects of the present study. Seven hundred twenty or 24.07 per cent earned their degrees in colleges in the Middle Atlantic States, while 713 or 23.85 per cent earned degrees in colleges in the East North Central States. The New England States ranks third in the conferring of degrees to the subjects, with 504 or 16.86 per cent earning degrees in

TABLE 14

STATE AND REGIONAL DISTRIBUTION OF THE INSTITUTIONS FROM WHICH THE SUBJECTS RECEIVED THE DOCTORATE

State and Region	Frequency	Per Cent
New England	504	16.86
Maine	0	.00
New Hampshire	0	.00
Vermont	0	.00
Massachusetts	368	12.31
Rhode Island	22	.73
Connecticut	114	3.82
Middle Atlantic	720	24.07
New York	531	17.75
New Jersey	47	1.57
Pennsylvania	142	4.75
East North Central	713	23.85
Ohio	31	1.04
Indiana	70	2.34
Illinois	415	13.99
Michigan	127	4.25
Wisconsin	70	2.34
West North Central	280	9.37
Minnesota	81	2.71
Missouri	38	1.27
North Dakota	3	.10
South Dakota	0	.00
Nebraska	25	.84
Kansas	6	.20
Iowa	127	4.25
South Atlantic	204	6.83
Delaware	0	.00
Virginia	7	.23
Maryland	41	1.37
District of Columbia	77	2.58
West Virginia	0	.00
North Carolina	77	2.55
South Carolina	0	.00

TABLE 14 - Continued

State and Region	Frequency	Per Cent
Georgia	1	.03
Florida	2	.07
East South Central	50	1.66
Kentucky	14	.47
Tennessee	34	1.13
Alabama	1	.03
Mississippi	1	.03
West South Central	77	2.57
Arkansas	0	.00
Louisiana	6	.20
Oklahoma	13	.43
Texas	58	1.94
Mountain	31	1.03
Montana	0	.00
Idaho	0	.00
Wyoming	0	.00
Colorado	18	.60
New Mexico	2	.07
Arizona	1	.03
Utah	10	.33
Nevada	0	
Pacific	278	9.30
Washington	35	1.17
Oregon	4	.13
California	239	8.00
Alaska	0	.00
Hawaii	0	.00
Canada	21	.70
Foreign	111	3.71
Total	2989	99.95

New England colleges. Colleges in the Mountain States ranked last in the awarding of doctorate degrees to subjects, with thirty-one or 1.03 per cent receiving degrees from schools in this region. Canadian universities awarded twenty-one or .70 per cent of the degrees, and foreign universities conferred 111 or 3.71 per cent of the doctorate degrees earned by the subjects of the present study.

Distribution of Degrees Earned by the Subjects in American Colleges and Universities According to 1962 Enrollments.--Table 15 shows the distribution of degrees earned by the subjects in American colleges and universities according to current enrollments of the institutions. The

TABLE 15

DISTRIBUTION OF DEGREES EARNED BY THE SUBJECTS IN AMERICAN COLLEGES AND UNIVERSITIES ACCORDING TO 1962 ENROLLMENTS

Enrollment	Bachelor's		Master's		Doctorate	
	Frequency	Per Cent	Frequency	Per Cent	Frequency	Per Cent
Over 10,000	1257	36.31	1741	58.03	1916	67.17
5,000 to 10,000	655	18.92	676	22.53	581	20.38
3,000 to 5,000	288	8.32	228	7.60	110	3.86
1,000 to 3,000	759	21.92	239	7.97	178	6.24
500 to 1,000	405	11.70	95	3.17	62	2.14
Under 500	98	2.83	21	.70	6	.21
Total	3462	100.00	3000	100.00	2853	100.00

data reveal that 1,257 or 36.31 per cent of the subjects took their first degree at institutions whose current enrollments are over 10,000, and only ninety-eight or 2.83 per cent at institutions whose enrollments are less than 500.

For the master's degree 2,417 or 80.56 per cent attended American institutions whose enrollments were 5,000 or more. Less than one per cent matriculated at institutions with enrollments less than 500.

For doctoral study 2,497 or 87.48 per cent chose institutions whose current enrollments are 5,000 or over. Only six or .21 per cent chose colleges or universities with enrollments less than 500.

Inspection of these data support the conclusion that, in the main, a large per cent of the subjects tend to choose larger institutions for degrees above the bachelor's.

Distribution of Degrees Earned by the Subjects in Canadian Colleges and Universities According to 1962 Enrollments.--Table 16, page 63, reveals the distribution of degrees earned by the subjects in Canadian colleges and universities according to their 1962 enrollments. Of the ninety-one subjects earning the bachelor's degree in a Canadian college, thirty-eight or 41.76 per cent attended schools whose current enrollment is over 10,000. Canadian colleges or universities whose 1962 enrollments is over 10,000 have awarded master's degrees to twenty-five or 54.35 per cent of the subjects. Over fifty-seven per cent of the subjects who received their doctorate degrees from Canadian universities attended schools with enrollments over 10,000. It is interesting to note that among those subjects who attended Canadian universities for master's and doctorate degrees none attended schools whose current enrollments are

TABLE 16

DISTRIBUTION OF DEGREES EARNED BY THE SUBJECTS IN CANADIAN COLLEGES AND UNIVERSITIES ACCORDING TO 1962 ENROLLMENTS

Enrollment	Bachelor's		Master's		Doctorate	
	Frequency	Per Cent	Frequency	Per Cent	Frequency	Per Cent
Over 10,000	38	41.76	25	54.35	12	57.15
5,000 to 10,000	13	14.29	8	17.39	5	23.81
3,000 to 5,000	18	19.78	5	10.87	0	0.00
1,000 to 3,000	8	8.79	1	2.17	2	9.52
500 to 1,000	13	14.29	7	15.22	2	9.52
Under 500	1	1.09	0	0.00	0	0.00
Total	91	100.00	46	100.00	21	100.00

less than 500.

Age at Which Subjects Received the Baccalaureate Degree.--Table 17 presents data concerning the chronological ages of the subjects when they received the baccalaureate degree. The ages are divided into five year periods ranging from 15-49. Inspection of these data reveal that the 3457 subjects, who listed the year that they earned the first degree, had a mean age of 23.34 upon receiving the baccalaureate degree. This is slightly higher than the average age when the first degree is received. The largest per cent of the subjects, 2,595 or 75.06 per cent received their degree between the ages of 20-24. The oldest age period that a subject received

TABLE 17

AGE AT WHICH SUBJECTS RECEIVED THE BACCALAUREATE DEGREE

Age When the Baccalaureate was Received	Frequency	Per Cent
45-49	4	.11
40-44	9	.26
35-39	26	.75
30-34	117	3.83
25-29	632	18.28
20-24	2595	75.06
15-19	74	2.14
Total	3457	99.98
Mean	23.34	

the baccalaureate degree was also the period with the smallest per cent of the subjects included, the period 45-49. The age periods with the next smallest per cent of the subjects were the periods 35-39 and 40-41 having 0.75 and 0.26 per cent, respectively. Two subjects received their baccalaureate degree at the age of seventeen.

Age at Which Subjects Received Master's.--Table 18 presents data concerning the chronological ages of the subjects when they received the master's degree. The ages are divided into five year periods ranging from fifteen to fifty-nine. Inspection of these data reveals that the

TABLE 18

AGE AT WHICH SUBJECTS RECEIVED THE MASTER'S

Age When the Master's Was Received	Frequency	Per Cent
55-59	1	.03
50-54	4	.14
45-49	14	.49
40-44	36	1.27
35-39	125	4.41
30-34	391	13.78
25-29	1297	45.76
20-24	965	34.02
15-19	3	.10
Total	2836	100.00
Mean	26.75	

2,836 subjects, who listed the year that they earned the master's degree had a mean age of 26.75. Almost eighty per cent of the subjects are included between 20-24 and 25-29. The oldest age period that a subject received the master's degree was also the period with the smallest per cent of the subjects included, the period 55-59. The next smallest per cent of the subjects is the youngest age period, the period from fifteen through nineteen, which includes three or 0.10 per cent of the subjects.

Age at Which Subjects Received Doctorates.--Table 19 presents data concerning the chronological ages of the subjects upon earning the doctorate. The ages are divided into five year periods ranging from twenty through sixty-nine. Inspection of these data reveals that the 2,971 subjects, who listed the year that they earned the doctorate, had a mean age of 32.44. This is slightly lower than the mean age of behavioral

TABLE 19

AGE AT WHICH SUBJECTS RECEIVED THE DOCTORATE

Age When the Doctorate was Received	Frequency	Per Cent
65-69	3	.10
60-64	6	.20
55-59	8	.27
50-54	28	.94
45-49	95	3.20
40-44	242	8.14
35-39	453	15.24
30-34	1057	35.58
25-29	987	33.22
20-24	92	3.10
Total	2971	99.99
Mean	32.44	

science doctorates of 1958 and 1959, who had a mean age of 33.29. The age periods 50-54 and 65-69 had the smallest per cent of the subjects included, each having less than one per cent. The age periods with the next smallest per cent of the subjects is the youngest age period, the period from 20-24 which includes ninety-two or 3.10 per cent of the subjects. The largest per cent of the subjects is included between the periods 25-29 and 30-34, each having 33.22 per cent and 35.58 per cent recpectively.

It is readily apparent from Table 19 that these subjects upon receiving the doctorate were far from being "callow youth" - that they were, on the average, thirty-two years of age.

Perusal of the data in Tables 17, 18, and 19 reveal the lapses in time which occurred between significant educational milestones. According to the means, about 9.10 years elapsed between the bachelor's and doctorate degrees. About 3.41 years elapsed between the receipt of the bachelor's and the master's degree, between the receipt of the master's degree and the doctorate about 5.69 years had passed.

Kinds of Positions that the Subjects Now Hold and Have Held in the Past.--Table 20, page 68, presents the data concerning the kinds of positions that the subjects now hdld and have held in the past. These data reveal that the subjects of the present study have held many positions prior to the present one, and that many of the subjects presently hold more than one position.

The positions previously held by the subjects included many different titles, most of which were directly or indirectly related to some type of educational institution. Inspection of these data reveals that about 75 per cent of the subjects have held instructional positions in colleges

TABLE 20

KINDS OF PROFESSIONAL POSITIONS THAT THE SUBJECTS NOW HOLD AND HAVE HELD IN THE PAST

Kind of Position	Frequency	
	Prior	Present
Educational		
Instructional	3036	1132
Secondary	124	
College and University	2912	1132
Administrative	556	1156
Research	624	256
Government		
Administrative	242	96
Research	476	200
Personnel	968	322
Business, Finance, and Industry		
Administrative	172	148
Research	168	152
Personnel	272	196
Military	1920	48
Public Service	704	692
Retired		35

and universities, about 40 per cent have held positions in government service, and a very small per cent have held positions in private industry, business and finance. A little less than seven per cent have held

professional positions in public service - largely in hospitals, clinics, and private practice. About fifty per cent of the subjects have been in military service.

Many of the subjects hold present positions similar to their prior ones. The largest per cent of the subjects hold positions in colleges and universities. About 60 per cent are now professors, administrators, or actively engaged in research. The next largest per cent of the subjects now hold public service positions. A few of the subjects are now in military service, and a little less than one per cent have retired.

These data conclusively reveal that the majority of the subjects of the present study have held and now hold positions in colleges and universities.

Memberships Held in Learned, Scientific and Professional Societies by the Subjects.--In Table 21 is found a list of the various Learned, Scientific and Professional Societies in which at least ten or .25 per cent of the subjects hold membership. Perusal of the data reveals that

TABLE 21

MEMBERSHIPS HELD IN LEARNED, SCIENTIFIC AND PROFESSIONAL SOCIETIES BY THE SUBJECTS

Organization	Frequency	Per Cent
American Psychological Association	1090	27.90
American Economic Association	957	24.54
American Association for the Advancement of Science	604	15.48
American Sociological Society	451	11.56
American Statistical Association	440	11.28
American Political Science Association	389	9.97

TABLE 21 - Continued

Organization	Frequency	Per Cent
American Anthropological Association	171	4.38
American Academy of Political and Social Science	157	4.02
Association of American Geographers	156	4.00
American Marketing Association	153	3.92
American Farm Economic Association	142	3.64
American Society for Public Administration	112	2.87
Econometric Society	111	2.84
American Finance Association	108	2.77
Industrial Relations Research Association	108	2.77
Midwestern Psychological Association	105	2.69
Eastern Psychological Association	102	2.62
American Geographical Society	85	2.17
Institute of Mathematical Statistics	78	2.00
Psychometric Society	75	1.92
Southern Edonomic Association	72	1.85
American Educational Research Association	71	1.82
Royal Economic Society	67	1.72
National Council of Geography Teachers	62	1.59
Population Association of America	61	1.56
National Education Association of the United States	61	1.56
American Personnel and Guidance Association	61	1.56
Society for the Psychological Study of Social Issues	60	1.54
Society for Applied Anthropology	56	1.44
Rural Sociological Society	53	1.36
Society for Research in Child Development	50	1.28
Southern Sociological Society	49	1.26
National Vocational Guidance Association	47	1.20
American Historical Association	44	1.13
Academy of Political Science	43	1.10
National Council on Family Relations	43	1.10
Society for Projection Techniques and Rorshach Institute, Inc.	42	1.07
American Society of International Law	41	1.05
American Accounting Association	40	1.02

TABLE 21 - Continued

Organization	Frequency	Per Cent
American Ethnological Society, Inc.	40	1.02
Society of American Archivists	40	1.02
Economic History Association	38	.97
Southern Society of Philosophy and Psychology	37	.94
Southwestern Social Science Association	37	.94
National Association of Social Workers	36	.92
American Orthopsychiatric Association	35	.89
Society for the Study of Social Problems	34	.87
Far Eastern Association	33	.84
Western Psychological Association	31	.79
American Public Health Association	30	.76
Midwestern Economic Association	30	.76
Canadian Political Association	29	.74
National Society for the Study of Education	27	.69
National Tax Association	26	.67
Southern Political Science Association	26	.67
Catholic Economic Association	25	.64
Society for the Advancement of Management	25	.64
American Association for Public Opinion Research	24	.62
American College Personnel Association	22	.56
American Association of Mental Deficiency	21	.54
Western Farm Economic Association	21	.54
Southwestern Psychological Association	20	.51
International Council of Women Psychologists	19	.49
National Association of Cost Accountants	19	.49
Western Political Science Association	19	.49
American Association of School Administrators	19	.49
American Association of University Teachers of Insurance	19	.49
American Catholic Psychological Association	19	.49
Government Research Association	19	.49
Mississippi Valley Historical Association	19	.49
American Academy of Arts and Science	18	.47
American Bar Association	16	.44
American Folklore Society	15	.38
Foreign Policy Association, Inc.	15	.38
National Municipal League	15	.38
Pacific Sociological Society	15	.38
American Arbitration Association	14	.36
American Mathematical Association	14	.36
Midwestern Sociological Society	14	.36
Royal Economic Society	14	.36

TABLE 21 - Continued

Organization	Frequency	Per Cent
American Association for Adult Education	13	.33
American Association of Marriage Counselors	13	.33
Western Economic Association	13	.33
American Catholic Sociological Society	13	.33
Adult Education Association	12	.31
Canadian Psychological Association	12	.31
Inter-American Society of Psychologists	12	.31
International Conference of Agriculture Economists	12	.31
International Political Science Association	12	.31
Pacific Coast Economic Association	12	.31
Society for International Law	12	.31
World Federation of Mental Health	12	.31
Canadian Institute for Internal Affairs	11	.28
Institute of Management Science	11	.28
International Statistical Association	11	.28
Midwestern Sociology Association	11	.28
National Academy of Arbitrators	11	.28
National Academy of Economists and Political Scientists	11	.28
National Council for Social Studies	11	.28
Ohio Valley Sociological Society	11	.28
Optical Society of America	11	.28
Royal Anthropology Institute	10	.25
American Catholic Social Science Association	10	.25
American Geographer's Union	10	.25
Institute of Pacific Relations		
International Council for Exceptional Children	10	.25
International Society for General Semantics	10	.25
Linguistic Society of America	10	.25
Midwestern Political Science Association	10	.25
Royal Statistical Society	10	.25
Society of Experimental Psychologists	10	.25

the 3900 subjects were affiliated with one or more learned and scientific organizations. The subjects as a group hold memberships in 840 different learned and professional groups.

Almost all of the subjects are affiliated with one or more learned societies which is directly related to their academic specialty. The

single organization which has the greatest number is the American Psychological Association with 1090 subjects or 27.90 per cent, followed by the American Economic Association with 957 or 24.54 per cent. The American Association for the Advancement of Science ranks third with 440 subjects having membership or 15.48 per cent.

The data also indicated that there is a greater tendency for the subjects of the present study to affiliate with national learned societies rather than with regional or state organizations.

CHAPTER III

SUMMARY, CONCLUSIONS, AND IMPLICATIONS FOR EDUCATIONAL THEORY AND PRACTICE

Problem, Purpose and Methodology.--The problem involved in this research was to study certain characteristics as revealed by the biographical sketches of the first 3900 individuals in the social and behavioral sciences listed in the ninth edition of American Men of Science edited by Jaques Cattell.

In terms of purpose the study was designed to achieve the following objectives.

1. To determine the geographical distribution of birthplaces of individuals in the social and behavioral sciences listed in American Men of Science.
2. To determine the geographical distribution of residences of individuals in the social and behavioral sciences listed in American Men of Science.
3. To determine the 1962 mean ages of individuals in the social and behavioral sciences listed in American Men of Science.
4. To determine the current marital status of individuals in the social and behavioral sciences listed in American Men of Science.
5. To determine the mean age at time of marriage by individuals in the social and behavioral sciences listed in American Men of Science.

6. To determine the current mean size of families of individuals in the social and behavioral sciences listed in American Men of Science.

7. To determine five characteristics, relative to educational training of individuals in the social and behavioral sciences listed in American Men of Science.

   (a) To determine the identity and geographical distribution of their baccalaureate origins.

   (b) To determine the identity and the geographical distribution of universities attended for graduate study to obtain Master's degrees.

   (c) To determine the identity and the geographical distribution of universities attended for doctoral study.

   (d) To determine the time lapse between the baccalaureate and the Master's degrees.

   (e) To determine the time lapse between the Master's and the doctoral degrees.

8. To determine the fields of specialization of individuals in the social and behavioral sciences listed in American Men of Science.

9. To determine the mean age at which individuals in the social and behavioral sciences listed in American Men of Science earned each degree.

10. To determine the kinds of professional positions individuals in the social and behavioral sciences listed in American Men of Science presently hold and have held in the past.

11. To determine the identity and the number of professional, scientific, and learned organizations and societies in which individuals in the social and behavioral sciences of American Men of Science hold membership.

12. To formulate whatever implications for educational theory and practice which may be indicated by the data.

The data requisite for this study were obtained from the largest biographical directory in the world, American Men of Science, which Jaques Cattell edited in three volumes in 1956. For the purpose of this study the third volume, which includes only social and behavioral scientist, was used. This directory includes sketches of eminent men and women who have met the following requirements: they have achievement equal to the attainment of the doctorate, they have research activity of a high quality, or they hold a responsible position requiring scientific training and experience.[1]

Summary of Related Literature.--The literature reviewed in connection with this study revealed that a number of studies had been published by J. McKeen Cattell an American Men of Science prior to the last two decades. Cattell believed that the main factor in producing scientific and other forms of intellectual performance seemed to be the density of population, wealth, opportunity, institutions and social traditions, and ideals. Recently a number of studies have been completed on individuals who have earned Ph.D.'s with the assumption that an examination of the early lives of the degree recipients may provide valuable clues concerning the factors which led to such success. Researchers generally agree that social conditions and freedom to work are the most important factors in producing scientific scholars. The literature reviewed for this study has been summarized and is presented under the following headings: (1) Former Studies of American Men of Science, (2) Backgrounds and Traits of Persons Earning Ph. D.'s, and (3) Heredity and

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[1] Du Shane, op. cit.

and Environment as Related to Eminence.

Former Studies of American Men of Science.--Former studies are summarized below.

1. In 1906, J. McKeen Cattell made a study of the geographical distribution of one thousand American scientist which also included their university of origin and their present university affiliations. He found that in general the North Atlantic States produced the most scientists and the South Central States the least. The concentration of scientists in cities was demonstrated. The birthrates of scientists in urban areas were found to surpass rural areas. The distribution of scientists among various universities and research agencies revealed that Harvard led in the number of scientists employed, followed closely by Columbia and Chicago. He found that those who pursued graduate studies at institutions from which they did not take bachelor's degree were distinctly higher in standing than the average A.B. or Ph.D.[1]

2. In 1910 Cattell did "A Further Statistical Study of American Men of Science" which was a revision of the 1906 study with additions to and deletions from the original list of scientists.[2] The findings were:

   (a) The major changes noted in the distribution of birthplaces indicated that the North Atlantic States had lost "seriously" in the production of scientists, while the North Central States had gained in every case except Illinois. The larger cities had lost ground in their production rate.

   (b) The Western States tended to add to the men that it had produced, while the South lost its men.

   (c) In reviewing the education of the men it was found that a larger proportion of the men included in the study held university degrees than was true of those first selected. Harvard, John Hopkins, and Chicago had the best record in conferring degrees while the University of Pennsylvania had the worst.

   (d) Their ages ranged from 30 to 45 with an average age of 38.1 for those added to the list, only six men under the age of 30 appeared on the list.

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[1] Cattell, Science, XXIV.

[2] Cattell, Science, XXXII.

3. An article by Cattell in 1917 presented marriage and fertility data for the one thousand outstanding men of science, selected in 1903. The article revealed that 10.5 per cent were unmarried. The scientists were somewhat older when they married than were their fathers at the time of their own marriage. The median ages were 28.4 and 26.9, respectively. The families from which the scientists came, had on the average 4.7 children. In contrast those scientists who were married and whose families were complete averaged only 2.3 children. Distribution of family size by the types of institutions in which the scientists were employed, revealed that those working in small state institutions came from the largest families and they themselves had more children than scientists working elsewhere.[1]

4. The fourth edition of American Men of Science reported the following distribution of 250 men starred for the first time and the 1,000 starred in the first edition. Eighty four per cent were born in the United States primarily in the North Atlantic and North Central States. Similarly the majority of the states seemed to have lost ground in both production and residents. Analysis of the group by university from which the degree was received indicated that Harvard was far ahead of all others with respect to the bachelor's degrees. Chicago, Harvard, and Columbia led in the number of Ph. D. degrees granted. An occupational analysis of the group showed that, while the majority earned their livings at teaching, there had been a definite increase in the number working in research and industrial laboratories. Harvard, Chicago, and Carnegie Institute led in the employment of scientists.[2]

5. Cattell's study on the distribution of American Men of Science in 1933 revealed that in general the North and Atlantic States lost in both production and residents from the first to the fifth edition. The North Central and Western States gained in both respects. Harvard, Columbia, and Chicago led in the number of degrees granted, and Harvard, Chicago, California, and Yale led in the number of the new group that they employed.[3]

Background and Traits of Persons Earning Ph. D.'s.--A number of studies were examined which dealt with the backgrounds of persons who had earned

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[1] Cattell, Scientific Monthly, IV.

[2] Cattell and Cattell, American Men of Science, 4th ed.

[3] Cattell and Cattell, American Men of Science, 5th Ed.

doctorate degrees. If it is a feasible assumption that the mark of academic success which may signify intellectual leadership, is the earning of a doctorate degree, then an examination of the backgrounds of the degree recipients would appear germane to this study.

1. Strauss made a study of 648 Ph. D.'s who attended 482 known secondary schools located in all but two of the states in this country. The median I. Q. of the group of Ph. D.'s was 120. It was found that large high schools are more productive of Ph. D.'s. All elements of the country's population seemed to have contributed doctorates to the group, although a disportionate number came from professional fathers, they did not constitute the preponderant group that former studies had revealed. The social scientist and the humanist were definitely older than the natural scientists when they received their degrees.[1]

2. A study of the high school backgrounds of 6,259 science doctorates made by the Office of Scientific Personnel, National Research Council reported that there are factors quite unrelated to later attainment of the doctorate that are more heavily involved in rank in high school than they are in intelligence test performance. This is particularly true in the social science field. This study reported that the physical and social sciences are outstanding fields at higher ability levels, followed closely by arts and humanities, with biological sciences and education lagging behind.[2]

3. Strauss and Brechbill conducted a study which involved sixty men who had earned the Ph. D. degree in the biological and social sciences using the technique of interview. They found that the biologists required an average of 8.7 years between earning the bachelor's and the doctorate degrees, while the social sciences took an average of 12.5 years. They concluded that the social sciences require greater maturity on the part of their practitioners than do the natural sciences.[3]

4. Wolfe and Oxtoby, in a study which revealed how students who choose one field of specialization resemble or differ from another, reported that students who major in Psychology have higher AGCT scores than those in social studies, while students in the natural sciences earn higher AGCT scores than other groups.[4]

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[1] Strauss, op. cit.

[2] Harmon, op. cit.

[3] Strauss and Brechbill, op. cit.

[4] Wolfe and Oxtoby, op. cit.

5. Roe studied a group of eminent psychologists and anthropologists in order to investigate the existence of the relationships between life history, intellectual functions, and the selection of a particular science career. She found that the intellectualization of interests was facilitated by the value which scientist families placed on learning, the importance of the need to achieve and maintain independence, the feeling of separateness from others and curiosity. Roe concluded that these subjects, although not well adjusted by a psychologists definition, were adjusted in the larger sense of being socially useful and happy in their work.[1]

Heredity and Environment as Related to Eminence.--The roles of heredity and environment in determining individual creativety have provided foci for much research. Cattell stressed that there is an interaction of these two factors that determines greatness, but the exact influence of each factor when taken separately is not known.

1. Galton maintained that mental capacities are hereditary, that they follow the laws of organic transmission and that these laws can be ascertained by careful observation. In comparing various groups of eminent men that he had studied, he found that: The general uniformity in the distribution among the kinsmen in the different groups is strikingly manifested. The eminent sons are almost invariably more numerous than the eminent fathers. There is a sudden dropping off in numbers at the second grade of kinship, another abrupt dropping off in numbers is again met with, but the first cousins are found to occupy a decidedly better position than other relations within the third grade.[2]

2. Cox studied 301 men and women of great historical eminence to discover the degree of mental endowment that characterized these individuals in their childhood and young adulthood. She concluded that youths who achieve eminence have in general, heredity above the average and superior advantage in early environment. It appeared that while an individuals chances for eminence are usually dependent upon a favorable opportunity, eminence is not a function either of heredity or or environment.[3]

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[1] Roe, op. cit.

[2] Stien and Heinze, op. cit.

[3] Terman, op. cit.

Terman's follow-up of geniuses after twenty-five years showed that some 50 of them had listing in American Men of Science or Who's Who.[1]

Summary of Findings.--The subjects were born throughout the 50 states, Puerto Rico, Canada, and many foreign countries. The data indicate that 43.10 per cent of the subjects were born in the Middle Atlantic and East North Central States, each having 22.64 and 20.46 per cent, respectively. New York was listed as the birthplace of 14.12 per cent of the subjects. The Mountain States ranked last in the production of the subjects. Four subjects listed Puerto Rico as a place of birth, and one subject listed only the United States. One hundred five of the subjects were Canadian born, while 317 of the subjects were foreign born.

Of the 3,417 native to the United States, 39.68 per cent were born in cities, which in 1960 had populations of 100,000 or over. According to the present population of their birthplaces, 21.13 per cent were born in rural areas. Sixteen of the subjects were born in towns which were not listed in the 1960 census.

The subject's residences are similar to their origins with Washington, D. C. and California making the grestest gains. The greatest number of subjects, 21.75 per cent are living in the Middle Atlantic States. The East North Central States rank second with 19 per cent of the subjects residing there, followed by the South Atlantic States with 18.69 per cent of the subjects. The state of New York, with 14.08 per cent of the subjects, has the greatest number of residents for one state. The states in the mountain region are the residences of the smallest per cent of the subjects. No subjects

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[1] Terman and Oden, op. cit.

reported Alaska as a place of residency. Four subjects are now living in Puerto Rico, 51 are residents of Canada, and 33 are residing in foreign countries.

Of those subjects now residing in the United States, 47.31 per cent are living in cities that have populations of 100,000 and 9.04 per cent of the subjects are now living in rural areas. Three of the subjects listed residences that were not included in the 1960 census.

The birthyears of the subjects ranged from 1866 to 1932. The greatest per cent of the subjects were born between the years 1908 - 1927.

The 1962 chronological ages of the subjects range from thirty to ninty-six. About 49 per cent of the subjects are fifty years of age or older. The mean age of the group is 51.73.

Data concerning the marital status of the subjects reveal that 73.72 per cent are married, 25.67 per cent are single, 0.46 per cent are divorced, and 0.15 per cent are widowed. The ages at which the subjects were married ranged from 16 to 65. Over 40 per cent of the subjects were married between the ages of 25 to 29, while less than one per cent were married after the age of 50. The 2,851 subjects, who reported the year in which they were married, had a mean age of 27.72 at the time of marriage.

When the married subjects are considered as a group, the mean number of children per subject is 1.32. Among the subjects who have children, the range in number of children is from a low of one to a high of twelve, with the modal number being two. At the present time, 24 per cent of the subjects have no children at all. There are 8.25 per cent of the families that contribute more than four children.

The biographical sketches revealed that the subjects as a group have

specialized in eighty-nine different fields. Some of the subjects listed two fields of specialization. Psychology was the leading field of specialization among the subjects with 29.32 per cent choosing one of the areas for specialization. Psychology was followed closely by Economics with 28.38 per cent of the subjects. Some of the other leading fields in which the subjects have specialized are Political Science, Sociology, Geography, and Statistics, in that rank order.

The data revealed that the subjects of the present study have attended the world's leading colleges and universities.

The institution leading all others from which the subjects earned the bachelor's degree is Harvard, followed by the University of California at Los Angeles and the University of Chicago.

Columbia University ranked first in the awarding of the masters degree to the subjects of the present study. The other two leading universities attended for second-level degrees were Harvard and the University of Chicago.

Harvard ranked first in the conferring of doctorate degrees upon the subjects. The University of Chicago and the University of California at Los Angeles ranked second and third, respectively.

Canadian and foreign universities have conferred a number of the degrees earned at all levels by the subjects. The University of Toronto, McGill University, and British Columbia University had the best records among Canadian colleges in conferring earned degrees upon these subjects.

The following predominately Negro colleges and universities led in the conferring of degrees upon the subjects, Howard University, Fisk, Atlanta University, and Morehouse College. It is interesting to note that Atlanta

University led in the number of masters degrees conferred, and Howard University in the number of undergraduate degrees conferred. The other leading colleges at the undergraduate level were Fisk and Morehouse.

Data concerning the geographical distribution of the institutions which awarded the baccalaureate degree to 3,622 of the subjects revealed that 19.10 per cent earned their degrees in colleges in the East North Central States, while 18.50 per cent earned their degrees in colleges in the Middle Atlantic States. Colleges in the state of New York conferred baccalaureate degrees on 12.42 per cent of the subjects. This was the largest number for a single state. Colleges in the Mountain States were attended by the smallest per cent of the subjects. Two persons earned their bachelor's degrees in Puerto Rican colleges, Canadain colleges conferred 2.51 per cent of the bachelor's degrees received by the subjects, while foreign universities and colleges conferred 2.10 per cent of the degrees.

An analysis of the data concerning the geographical distribution of the institutions which awarded the masters degree to 3,106 of the subjects, revealed that 22.53 per cent of the subjects earned their degrees in colleges in the Middle Atlantic States. Colleges in the states of New York and Massachussetts awarded the most master's degrees for single states, 14.86 and 11.56 per cent, respectively. Colleges in the Mountain States ranked last in the awarding of master's degrees to the subjects of the present study. Canadian universities conferred 1.49 per cent of the degrees, and foreign universities conferred 1.68 per cent of the masters degrees earned by the subjects.

Colleges in the Middle Atlantic and East North Central States have conferred almost 50 per cent of the doctorate degrees earned by the 2,989 subjects

who had earned the degree. Doctorate degrees were earned by 24.07 per cent of the subjects in colleges in the Middle Atlantic States, while 23.85 per cent earned degrees in East North Central Colleges. The New England States ranked third in the conferring of doctorate degrees upon these subjects, with 16.86 per cent earning degrees in New England colleges. Colleges in the Mountain States ranked last in the awarding of doctorate degrees to the subjects, with 1.03 per cent receiving degrees from schools in that area. Canadian Universities conferred 0.70 per cent of the earned doctorates upon these subjects, and foreign universities conferred 3.71 per cent of the doctorate degrees earned by these subjects.

A look at the baccalaureate origins of the subjects, who earned their degree in an American college, reveals that 55.23 per cent attended colleges whose current enrollments are over 5,000, and only 2.83 per cent at institutions whose current enrollments are less than 500.

Of those subjects earning the masters and doctorate degrees in American universities, at least 80 per cent took the degree at colleges with current enrollments of 5,000 or more. Less than one per cent of the subjects chose colleges whose current enrollments are less than 500 for graduate and doctoral study.

The largest per cent of subjects who earned degrees in Canadian colleges and universities attended institutions whose current enrollment are 5,000 or more. No subjects attended Canadian colleges whose current enrollments were less than 500 for degrees above the baccalaureate.

The 3,457 subjects who listed the year that they earned the baccalaureate degree had a mean age of 23.34 upon receiving that degree. The largest number

of subjects, 75.06 per cent received their degree between the ages of twenty and twenty-four years. One subject received the bachelor's degree at seventeen.

The mean age of the 2,836 subjects who listed the year that they earned the masters degree was 26.75. Almost 80 per cent of the subjects earned their degree between the ages of twenty and twenty-nine.

The 2,971 subjects listing the year in which they took the doctorate had a mean age of 32.44 upon earning the degree. About 70 per cent of the subjects earned the doctorate between the ages of twenty-five and thirty-four. Less than two per cent of the subjects earned the degree after fifty.

These data concerning the mean ages of the subjects when they passed significant educational milestones revealed that about 9.10 years elapsed between the receipt of the bachelors and the doctorate degrees, about 3.41 years elapsed between the receipt of the bachelor's and the masters degrees, and 5.69 years had passed between the receipt of the master's and the doctorate degrees.

The subjects of the present study have held many positions prior to the present one, and many of the subjects now hold more than one position.

The positions previously held by the subjects included many different titles, many of which were directly or indirectly related to some type of educational institution. About 75 per cent of the subjects have held instructional positions in colleges and universities, about 40 per cent have held positions in government service, and a very small per cent have held positions in private industry, business, and finance. A little less than 7 per cent have held professional positions in public service - largely in hospitals,

clinics, and private practice. About 50 per cent of the subjects have been in military service.

Many of the subjects hold present positions similar to prior ones. The largest per cent of the subjects hold positions in colleges and universities. About 60 per cent are now professors, administrators, or actively engaged in research. The next largest per cent hold professional positions in public service and government service, in that rank order. A small per cent are in military service and less than one per have retired.

The subjects as a group hold memberships in 840 different learned, scientific, and professional societies. Almost all of the subjects are affiliated with one or more learned societies which is directly related to their academic speciality. The single organization which has attracted the greatest number of subjects is the American Psychological Association with 27.90 per cent, followed by the American Economic Association with 24.56 per cent of the subjects holding membership. The other organizations in which at least 10 per cent of the subjects hold memberships are the American Association for the Advancement of Science, the American Sociological Society, and the American Statistical Society.

Conclusions.--The conclusions of this study are based wholly upon the data which were obtained from the biographical sketches of the first 3,900 individuals listed in the ninth edition of American Men of Science, Volume III. Analysis, synthesis, and interpretation of these data enabled the writer to move from the purposes posed in Chapter I to the eleven conclusions which are identified below. The following statements which follow may be considered as the basic conclusions in light of the findings of this study.

1. The subjects were born throughout the fifty states, Puerto Rico, Canada, and many foreign countries. About 90 per cent were born in the United States. The Middle Atlantic and East North Central States led in the production of these subjects. The data conclusively reveal that the urban areas have led in the production of these subjects.
2. The subjects are presently located throughout forty-nine of the fifty states, Puerto Rico, Canada and many foreign countries. About 97 per cent are residents of the United States. The greatest number of subjects are now living in the Middle Atlantic and East North Central States. The Mountain States rank last as places of residences for the subjects. In the main, their residences are similar to their origins with Washington, D. C. and California making the greatest gains. The subjects tend to be concentrated in large cities. There seems to be some relationship between the geographical centering of the subjects and the choice of their vocation.
3. The birthyears of the subjects ranged from 1932 to 1866. The 1962 chronological ages of the subjects ranged from 30 to 96, with the group having a mean age of 51.73. About 49 per cent of the subjects are fifty years old or older.
4. About 3 out of 4 of the subjects are married. Less than one per cent of the subjects are now widowed or divorced.
5. The ages at which the subjects were married ranged from 16 to 65. The mean age at which they were married was 27.72. There is every likelihood that if the subjects are not married by fifty they will

not marry.

6. The subjects tend to have very few, if any children. The current mean size of the families of the subjects is 1.32. Among those subjects who have children, the range in number of children is from a low of one to a high of twelve, with the modal number being two. Twenty four per cent of the subjects have no children.

7. The subjects have attended the world's leading colleges and universities. In the main, the subjects tended to take all degrees at larger colleges and universities.

   (a) The institutions leading all others from which the subjects have earned the bachelor's degree is Harvard, followed by the University of California at Los Angeles and the University of Chicago. Colleges in the East North Central States and the Middle Atlantic States led in the baccalaureate production of these subjects.

   (b) Columbia ranked first in the awarding of the Master's degree to the subjects, followed by Harvard and the University of Chicago. Colleges and universities in the East North Central and Middle Atlantic States led in the number of earned master's degrees conferred upon these subjects.

   (c) More doctorates were earned at Harvard than at any other university. The University of Chicago and the University of California at Los Angeles ranked second and third, respectively, in the awarding of earned doctorates to the subjects. Colleges in the Middle Atlantic and East North Central States conferred almost 50 per cent of the doctorates earned by the subjects.

   (d) On the average, 3.41 years elapsed between the time that the subjects received the bachelor's and masters degrees.

   (e) The average lapse in time between the receipt of the master's and the doctorate degrees was 5.69 years.

8. The subjects have specialized in eighty-nine different fields. More subjects have specialized in Psychology than any other field. Economics ranked second. Some of the other top ranking fields of specialization are: Political Science, Sociology, Geography, and Statistics.

9. The subjects had a mean age of 23.34 upon receiving the baccalaureate degree, a mean age of 26.75 on earning the masters degree, and a mean age of 33.22 upon taking the doctorate degree.

10. Many of the subjects have held many positions prior to the present one, and many of the subjects presently hold more than one position. Most of the subjects presented have held and now hold many positions which are directly or indirectly related to some type of educational institution. The largest per cent are now professors, administrators, or actively engaged in research. About one per cent of the subjects have retired.

11. The subjects as a group hold memberships in 840 different learned, scientific, and professional societies. Almost all of the subjects are affiliated with one or more learned societies which are directly related to their academic speciality. The organization in which the greatest number of subjects hold membership is the American Psychological Association, followed by the American Economic Association. The subjects tend to affiliate with national learned, scientific, and professional societies rather than with regional or state organizations.

Implications.--The interpretations and findings of this study appear to warrant the following implications.

1. It is well known that the various geographical regions of the country are not equal in their production of scientists and other scholars. The concentration of fellowship - holders in a limited number of high prestige institutions has stirred some fear that the

country's intellectual resources are becoming too highly concentrated in certain regions. It follows then that higher education in these deprived geographic regions should receive assistance and counsel from local, state, regional and federal governmental agencies and from foundations, industry and business toward the end that educationally deprived sections of the country will become increasingly attractive to eminent scholars as well as to individuals who possess the potentiality to obtain eminence.

2. On the average, the social and behavioral scientists of American Men of Science are beyond the years of greatest intellectual productivity and creativety. This means that most of the mean and women who have not made significant contributions to their specialty are not likely to do so at this late date. It follows that if America is to keep moving forward in scientific circles, every effort must be made to replace these men and women.

3. Since the subjects of the present study have so few children, it is very unlikely that they will provide family constellations from which emerge very many outstanding scholars of tomorrow.

4. Since we can reasonably assume that these subjects are individuals who possess the intellectual and motivational characteristics associated with high scholarship and research, then all of them should be encouraged to obtain the doctorate. These doctorates should be won between the ages of twenty-five and thirty if the individual is to make more than a minimal contribution to productive scholarship and research after he or she earns the doctorate. The younger one is when he takes the doctorate, the more likely

that his contribution to his field will be more outstanding.

5. If America is to continue to compete successfully with the Soviet Union we will need a broader understanding in the fields of the social and behavioral sciences so that we will not only be able to explore the exosphere but also so that we will be able to understand the theory and practice of communism. Therefore, every effort must be exerted to identify young people who have the intellectual ability and the interests necessary for high scholarship and guide them into these fields. Such individuals should then be helped psychologically, educationally, and financially to obtain the highest academic and professional degrees.

Limitations.--This study is characterized by all the limitations which are associated with the descriptive survey method of research. Some of the biographical sketches were not complete as the subjects did not in all cases include the years that degrees were earned, the name of the institution awarding the degree, and sometimes the place of birth. It is highly possible that some of the subjects had earned higher degrees but did not indicate them in their sketches. There are always legitimate questions which can be raised about the truthfulness of respondents' replies to questionnaires. It is assumed however, that the material listed in American Men of Science was valid.

The writer realized that there have been general population migrations over the ninety-six year span covered by these data, and that such population shifts must have had some effect on the general population which eventually became listed in American Men of Science, however, this study did not

concern itself with the net changes over and above the general population shifts.

BIBLIOGRAPHY

Books

Cattell, J. McKeen and Cattell, Jaques (eds.) American Men of Science. 4th ed. New York: Science Press, 1927.

_____, American Men of Science. 5th ed. New York: Science Press, 1933.

_____, Jaques. (ed.) American Men of Science - The Social and Behavioral Sciences. Volume III New York: A. A. Bowker Co., 1956.

Foster, Fred W. (ed.) School and Library Atlas of the World. Cleveland, Ohio: Geographical Publishing Company, 1961.

Irwin, Mary. American Universities and Colleges. Washington, D. C.: American Council on Education, 1962.

Keyes, H. M. R. (ed.) International Handbook of Universities. Great Britian: A. and A. Clark, Ltd., 1959.

Stein, Morris I. and Heinze, Shirley J. Creativity and The Individual. Glencoe, Illinois: The Free Press, 1960.

Terman, L. M. Genetic Studies of Genius. Volume II: The Early Mental Traits of Three Hundred Geniuses by Catherine Cox. Stanford, California: Stanford University Press, 1926.

Terman, L. M. and Oden, Melita H. The Gifted Child Grows Up: Twenty-Five Years' Follow-Up of a Superior Group. Stanford, California: Stanford University Press, 1947.

The World Book of Facts. New York: New York World Telegram and The Sun, 1962.

Articles and Periodicals

Cattell, J. McKeen. "A Statistical Study of American Men of Science III. The Distribution of American Men of Science, " Science XXIV (December, 1906) 732-42.

_____., "A Further Statistical Study of American Men of Science", Science XXXII (November, 1910), 633-48.

Cattell, J. McKeen. "Families of American Men of Science - Marriage and Number of Children", Scientific Monthly, IV (March, 1917), 248-62.

"The Cost of Science Education", Scientific American, CCV (September, 1961), 84.

Du Shane, Graham. "Among the Missing," Science, CXXX (July, 1959), 195.

Harmon, Lindsey R. "High School Backgrounds of Science Doctorates", Science, CXXXIII (March, 1961), 679-88.

Roe, Anne. "A Psychological Study of Eminent Psychologists and Anthropologists, and a Comparison with Biological and Physical Scientists", The Psychological Monographs, LXVII, No. 2 (1953).

Strauss, Samuel and Brechbill, Harry. "Traits of Scientists", Science Education, XXXIII (February, 1959), 35-41.

_____., "High School Backgrounds of Ph. D.'s," Science Education, XXXIV (February, 1960), 45-51.

Visher, Stephen S. "J. McKeen Cattell and American Science," School and Society, LXVI (December, 1947), 451.

Wolfle, Dael and Oxtoby, Tobey, "Distribution of Ability Students Specializing in Different Fields", Science, CXVI (September, 1952), 311-14.

Reports

Harmon, Lindsey R. and Soldz, Herbert. Science Doctorates of 1958 and 1959. A report prepared for the National Science Foundation by the National Academy of Sciences - National Research Council. Washington, D. C.: U. S. Government Printing Office, 1960.

Wolfle, Dael L. "What is the Responsibility of Higher Education for Making the Most Effective Use of the Nation's Manpower, Especially for Staffing, the Professions and Other Specialized Fields?" A Report to the Tenth Annual Conference on Higher Education: Chicago, February 28 to March 20, 1955. Current Issues in Higher Education. Washington, D. C., 1955.

Public Documents

Scientists and Engineers in the Federal Government, October, 1958. Washington, D. C.: U. S. Government Printing Office, 1958.

U. S. Department of Commerce, 1960 Census of Population. Washington, D. C.: Government Printing Office, 1961.

U. S. Department of Health, Education, and Welfare. Earned Degrees Conferred, 1959-1960. Circular No. 687. Washington, D. C.: Government Printing Office, 1961.

U. S. Department of Health, Education, and Welfare. Opening (Fall) Enrollments in Higher Education, 1962: Institutional Data. Circular No. 697.

Other Sources

Letters from Howard G. Brunsman, Chief Population Division, Bureau of the Census, U. S. Department of Commerce, Washington 25, D. C., May 24, 1963.

Letter from William P. Isaffaras, Division of Research, Department of Commerce, Boston, Massachussetts, May 8, 1963.

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